THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME XC., No. 17. Whole No. 1,768. | NEW YORK, MONDAY, APRIL 26, 1909. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. H. WADELTON, Manager.
THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

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BRIEFLY TOLD.

OBITUARY NOTE, JAMES R. FLOYD.—A fortnight ago we chronicled the death of Mr. James R. Floyd, whose time on earth was at an end the morning of the 6th inst. Deceased was perhaps one of the best known men in the gas fraternity from the period lasting from 1860 to 1890, for in that 30 years the fame of the Oregon Iron Works extended to wherever gas was made and sold. James R. Floyd was born in New York City, September 20, 1826, or just about the time that the first gas works (those of the New York Gas Company) of the city was put into commission. Having to make out for himself, at an early age he obtained employment in an iron foundry and speedily acquired the arts of the moulder's trade. Alert, energetic and resourceful his advance in his chosen trade was so rapid that in 1847 he was appointed foreman of the then famous iron working establishment of Mott & Ayres. It was in that service that he devised important changes in the guide columns for the holders of the Manhattan Gas Co.'s 14th and 18th street stations. These columns are noteworthy from the fact that they were cast in one piece, and were possibly 32 feet in height. Having mastered the moulder's art thoroughly, he formed a partnership with Silas C. Herring, whose name to-day is known the world over, although death claimed him many years ago, under the firm name of Herring & Floyd, the latter assuming charge of the section devoted to getting out the castings for the Herring type of safe. This foundry was situated on upper Greenwich street, and covered about an acre of ground, the office premises being located in No. 742 Greenwich. At the time of its starting in the admission of Oregon to Statehood in the Union was the prominent topic of the day, hence the name Oregon was given to the shops. This partnership lasted for 25 years, or until the death of Mr. Herring in 1881, when the business was taken over by Mr. Floyd and operated under his own name, and later, in connection with his three sons, the title of the firm being that of Jas. R. Floyd & Sons. In 1886 a new plant was constructed at the foot of West 20th street, which was modern in every respect, and which gained added fame for the Oregon founders. A notable thing is that the flagstaff on the central building carried at its wind vane the gilt herring that formerly surmounted the staff when the Greenwich street plant was put in commission. Mr. Floyd was quite an inventor, as many of the old-line gas men will remember without much thinking. Notable in his work was a malleable iron lid for retorts (we venture to say some of these mouthpieces will be found in more than one Southern gas works to-day), which was also adapted to facilitate the working of a self sealing mouthpiece, noted changes and betterments in the construction of hydraulic mains, and, ante-dating these, or during the continuance of the Herring & Floyd partnership, he patented the use of Franklinite (manganese) iron for the burglar proofing of safes, which gave the Herring style of construction a world-wide reputation, and which continued in vogue amongst later day safe makers, until the more modern methods of producing and applying steel revolutionized more than one art. In the 40 years, beginning 1861, his fine constructive hand was shown in the furnishing of apparatus for gas works, especially in this city, in Eastern cities, and in places along the Hudson river. In fact, it would be hard to name a city in the States as these stood 10 years ago, the gas works of which did not possess something in its make-up that was traceable to the Oregon Foundry. He was a charter member of the American Gas Light Association, and old-timer's will well remember his large share in providing for the hospitalities tendered the Association on its earlier meetings in New York and Brooklyn. Socially he was well-known and well-liked, and this was especially true of his religious connections. A practicing Catholic, he gave freely of his time, advice and wealth to its cause. He was the oldest living Manager of that noble charity, the Catholic Protectory, and at one time its President, and was largely instrumental in the deeds and acts which led to the construction of that imposing edifice—the Cathedral—that so harmoniously towers above 5th avenue on the 50th-51st block east. He had also been Chairman of the Irish Emigrant Society, Chairman of the Building Committee of the Emigrant Industrial Savings Bank, on Chambers street, and prominent for many years on the Board of Managers of the Roman Catholic Orphan Asylum Society. To sum it all up, Mr. James R. Floyd, in the heyday of his business career, was noted for his charities, which were many, valuable and unostentatious. He was the close associate and friend of such gas men as C. Van Smith, Jas. Russell Thomas, M[illegible]

APR 26 1909
SMITHSONIAN DEPOSIT

G. Warren Dresser, Gen. Charles Roome, George A. McIlhenny, Wm. Henry White—all dead and gone these are; but even to-day their memories are guides to the workers of the hour. Amongst the living who worked with him for the good of the profession we may name A. M. Smith, Wm. H. Bradley, Dr. E. G. Love, John McIlhenny, Col. Fred. S. Benson, Thos. E. Byrne. But we may as well stop here—for every gas man who was his contemporary in 1870 could be written down his friend. To the writer he was personally and well known, and the testimony is here given that none ever applied to "Jim." Floyd for aid that failed in obtaining it when he was able to give. In 1850 he was united in marriage to Miss Caroline Requa Chatterton, and of this union two daughters and two sons survive.

GAS LIGHTING AND THE TUNGSTEN ELECTRIC REDIVIVUS.—Appropos of the tungsten lamp situation Mr. H. H. MacPherson, in an article printed in the *Electrical World*, speaks as follows: "Several years of hard personal work has taught people in most cities that a gas range and an electric iron are two absolutely necessary things to have in a home. In that same time thousands of families have changed from the electric lamp to the incandescent gas lamp, and thousands more have complained of the poor light given by the electric lamp, and have threatened to change to gas. These families appreciated the convenience and all the other advantages of the electric lamp, but they knew that they should have a stronger and whiter lamp that could be placed further away, hence they adopted the incandescent gas lamp. Now that the tungsten lamp has arrived the proper electric lamp is in the hands of the electric companies to take advantage of the situation. In the business territories electricity has been superseded by gas in hundreds of places because the business men wanted more light for less money. Even in the smaller cities the business men have been educated to believe that the proper amount of light is comparable to a good location in business-bringing ability. Thousands of merchants who have been barred from the lavish use of light for display purposes on account of cost are now placed in a position where they can use it to advantage." While the tungsten lamp is surely not all that is claimed for it, the immense amount of advertising done on its behalf is bound to have a most telling effect upon the marketing of the product. A most important feature of the situation that has not been mentioned in the candid statement above quoted, has to do with the improvement in gas lamps, mantles and accessories. Unfortunately the public has not heard much about them, and, in fact, even the fraternity has accepted them in rather a matter-of-fact way. As far as costs are concerned the margin is such a safe one as to need no cause for anyspecial argument. And a factor about which too little is heard, and about which we should have cause for considerable gratification, concerns the color value. It is generally conceded that electric arc lamps have seen their day, and this is the only commercial unit which has a color value nearer to daylight than the mantle gas lamp. As the matters of cost, hygiene and color value are unquestionably to be found in favor of mantle gas lighting, it behooves us to get busier than ever before to spread their adoption. When introducing these lamps it is highly important that gas companies retain more than casual supervision over them, especially for commercial lighting. The most satisfactory system for the introduction of gas ranges has been in renting them, for they are sure to be, not only in place but also ready for use. If this has been found successful in the instance of ranges it is doubly so with mantle burners. Put them out, see that they stay put, and sell from 3,000 to 4,000 cubic feet per capita for lighting purpose alone. Let others follow who may. —SPECTATOR.

[Continued from Page 678.]

Review of the Twenty-Fourth Annual Report, Massachusetts Board of Gas and Electric Light Commissioners.—No. II.

[Prepared for the JOURNAL, by MR. H. THURSTON OWENS.]

FINANCIAL OPERATIONS.

The total income from all plants for the past 3 years is given in Table I.

TABLE I.—*Showing Income of Private and Municipal Gas-Electric Plants for the Years* 1906-7-8.

	1906.	1907.	1908.
Gas companies.....	$9,256,946.62	$9,789,482.74	$10,433,307.52
Electric companies.....	8,927,918.51	9,776,430.63	10,401,550.49
Municipal gas plants...	226,425.04	225,365.48	251,638.85
" electric plants.	374,031.33	449,468.96	503,380.82

Income of Gas Companies.—The only item which in 1907 showed a decrease was that of sales of tar, which this year shows an increase of over $12,000. Sales of gas by meter show an increase of $509,773.84, as against $452,690.25 for the previous year, and represent 88 per cent. of the total income. Receipts for gas supplied to public lamps show an increase of $8,668.59 as against $6,292.13 for the previous year.

The increase from the sales of coke was over three times as great as in the year 1907, the total sales amounting to $491,366.43, or 4.8 per cent. of the total income.

The receipts from all of the 11 sources given show increases, with the exception of "rent of gas stoves and engines." In the year 1907 the increase was large in percentage, whereas this year the decrease was 88.9 per cent. The income from the rent of gas lamps shows a good, healthy growth, and if one compares the expenses incidental to maintaining the above appliances some peculiar results appear, as will be seen through an examination of Table II.

TABLE II.—*Showing Income and Expenses Pertaining to Appliances for the Years* 1906, 1907 *and* 1908.

Income.	1906.	1907.	1908.
Rent of gas stoves and engines.....	$155.89	$2,844.50	$315.02
Rent of gas lamps	2,023.79	7,093.00	11,160.89
Total	$2,179.68	$9,937.50	$11,475.91
Expenses.			
Gas stove fixing, repairs, etc.....	$81,224.93	$102,092.16	$55,418.31
Lighting and repairing (gas lamps).	42,729.52	68,443.01	55,418.31
Total.....	$123,954.45	$170,535.17	$159,088.44

In round figures it cost $104,000 to maintain appliances for which $300 in rent was received in the case of stoves and engines, whereas it only cost $55,000, or slightly over half, to maintain gas lamps, the rent from which amounted to $11,000. It is, of course, understood that the profit from these operations should very properly accrue from the sales of gas and not through sales or rental of appliances, but it would appear from the figures given that the companies were assured of greater returns and more satisfactory service in the case of lamps, owing to the greater supervision which they have over leased appliances.

EXPENSES.

The figures on expenses are made up from the same items as those given for the year 1907,[1] and the totals for all gas companies for the past 3 years show as follows:

	1906.	1907.	1908.
Expenses ..	$6,431,938.74	$6,997,830.11	$7,690,012.50

Comparing the increase in the past 2 years, of income and expenses, we find that the latter increased in a larger ratio than the income, as will be seen from the figures, which are as follows:

	Increase	
	1907 over 1906.	1908 over 1907.
Income.....	$532,541.12	$643,824.78
Expenses.....	565,891.37	692,182.32

The expenses are divided into 27 items, and of these 6 showed a decrease in 1907 and 5 in 1908; one item appearing in both cases—apparatus and machinery.

As this item also shows a decrease in the figures given for electric plants, the amounts expended under this item for the past 3 years are reproduced:

	1906.	1907.	1908.
Gas.....	$51,750.54	$45,299.75	$37,729.00
Electric...	58,605.57	52,585.41	45,443.51

As practically all items on repairs show increases in both cases, the statements of manufacturers as to substantial returns from this class of business are borne out by the facts.

Several salaries show an increase in the case of gas plants, while the reverse is true of electric properties. The increases in the cost of coals and enrichers were as follows:

	Increase.	
	1907 Over 1906.	1908 Over 1907.
Coals.....	$190,790.03	$227,023.11
Enrichers....	151,783.04	111,149.43
Total.....	$342,573.07	$338,172.54

Comparing the four most important items with the total expense, we find the result on a percentage basis in Table III.

TABLE III.—*Showing Percentage of Total Expense for Coal Enrichers, Wages and Taxes for* 1907 *and* 1908.

	1907.	1908.
Coal.....	$23.08	$23.9
Enrichers	11.4	11.8
Wages	9.9	9.3
Taxes.....	9.0	8.9

Wages in municipal works for 1908 represented 22.5 per cent. of the expenses. To which the attention of advocates of municipal ownership is requested.

One item of expense which we always look forward to with confidence that it will show an increase is that of taxes, and in the case of gas companies such was the case; but not with elecric companies, as will be seen from the figures for each:

Taxes.	1906.	1907.	1908.
Gas companies.....	$581,596.31	$630,790.33	$672,050.15
Electric companies.	685,810.46	736,321.51	722,454.68

The average on this account per 1,000 sold for gas companies was 6.2 cents.

Bad Debts.—The percentage of collections made by electric lighting companies, as compared with those made by gas companies, shows greatly in favor of the latter, as will be seen from the following figures:

Bad Debts.	1906.	1907.	1908.
Gas companies....	$10,394.57	$10,504.76	$11,763.65
Electric companies.	22,996.76	24,651.39	38.930.10

1. See JOURNAL, June 8, 1908, p. 971.

(To be Continued.)

[Official Report.—Continued from Page 686.]

PROCEEDINGS, FIRST ANNUAL MEETING, SOUTHERN GAS ASSOCIATION.

Held in the Grunewald Hotel, New Orleans, La., Feb. 18, 19 and 20.

Second Day—Morning Session.

The President introduced Mr. R. C. Congdon, of Atlanta, Ga., who read the following paper on

PUBLIC POLICY.

It is, I believe, not difficult to get along with the public, if we bear in mind the Golden Rule, and treat our fellow man as we would have him treat us under similar circumstances. If, as we do, remember that honesty is the best policy; if we view the customer's complaint from his point of view, always remembering that "A soft answer turneth away wrath." It is also well to remember how to smile, for most people prefer a man with a cheerful disposition to one seemingly suffering from some internal derangement.

Add to the above good health, good habits, well-rounded knowledge of the gas business, judgment of human nature and an ignorance of all that pertains to laziness, then I think you will agree with me that you are equipped to meet friend and foe, and all others between these extremes.

Policy is defined by Webster as a system of official administration. Public policy is that branch of the company's general policy which pertains to the company's customers, those desiring to become customers, others who may become customers, and the people in general whose rights and privileges as citizens of the community must be respected.

The Company's Policy and its Customers.

I had just written the above heading when I stopped to open a letter from one of our neighboring gas companies. Our good gas friend writes, "I would like very much to know what are your rules governing charges for moving gas stoves from one part of the city to another, and from room-to-room in the same house. I would appreciate very thoroughly an outline of your policy in this matter." Such a letter suggests the value of a Southern Gas Association, and questions of this nature come under the above heading, as would also the selling, installing and maintaining of gas appliances, demonstrations, method of charging for gas, rules governing gratuitous work, repair work, etc. But the question of policy, which interests me most at present, and which comes under the division I have chosen, is what are we doing to introduce to our customers in the true light our tried and trusted friend, the gas meter. The sound of these words is almost as ominous to the average customer as "Cop." is to the Southern negro. The gas meter is first cousin to the gas bill, but the former is father and mother of most of our troubles.

One of the greatest problems still before us is how, when charging a reasonable amount per 1,000 for gas, to make each customer satisfied that he is not paying more per 1,000 for gas than is his neighbor; that he is not paying for something he never got; that he is paying only a just sum, and that the gas bill, as rendered, is correct.

I like to dwell on the word customer, and think what it means in the economic sense. I like to think of that great army of people depending upon our regiment, our small group of men to supply the daily needs with which to continue the battle of life under the most comfortable circumstances. It is a pleasure to think of the great number of families gathered three times each day to enjoy their daily bread cooked with gas. It is a pleasure to think of the comfort afforded by the water heater, the gas radiator, the gas iron and other innumerable gas appliances, so useful in each community.

Haven't you ever passed, on your way home from work, a brightly lighted window, and haven't you paused to view, with a certain degree of pleasure and satisfaction, that picture of comfort where the family is seen gathered around a Welsbach reading light in good working order, the head of the household enjoying his evening paper? Haven't you ever thought, when viewing such a picture, how glad you were to be a real live factor in the community, and how you wished you could make all your customers as content with the gas service as this family appeared to be? But haven't you also thought of the gas bill finally presented, spoiling all your efforts to make your customers satisfied, transforming the above picture into one of discontent and bad feeling toward the company? Of course you are all familiar with the complaint of the fellow who says he is being overcharged because his bill is larger than his neighbor's, and he has only three in the family, whereas his neighbor has seven. He never entertains or sits up late, but his neighbor does entertain, and his house is seldom dark before midnight. You are familiar, too, with a great many other complaints, which the dissatisfied customer makes in support of his statement that he "knows" that he has been overcharged. Some customers pay a bill, stating they knew they were paying for something they never got; as the family was away a part of the month, the gas bill should be much less than the previous one. Other customers know that they didn't burn the gas, and that "there must be a leak."

I think I might say, without fear of successful contradiction, that we who come in contact with the public are familiar with most all the complaints possible in our business. Surely this is true as regards complaints of large bills. Why are we so familiar with complaints about the gas bill and gas meter? Isn't it because we have heard them all our lives? Because we still hear them every day? But isn't it more particularly because the gas companies have not taken proper steps toward educating the people?

In the light of additional information, haven't you often changed your mind; and isn't it possible the customer can be made to have faith in the meter, and be satisfied with his bill? Of course, all of our customers do not complain. On an average I do not receive more than 10 written complaints each month, but a great many people do not find fault because they think it is not worth while to "kick"—"there's only one gas company." Of the complaints that come to my desk 99 per cent. are against the gas bill. It is very rare indeed that I hear fault found with the service.

The customer thinks he has been overcharged. Has he come to this conclusion with a full list of facts before him? No; if he had known the facts as we know them, isn't it possible he would have been satisfied? Yes. Then why not give all our customers all the information we can that will tend to make them more content, and by this means secure their goodwill, a valuable asset to any company?

Would it not be of interest, and likewise instructive, to explain in an elementary way how gas is made? Don't you think it would start them thinking, if we explained how we could sell them 10 cubic feet of gas and pass it to them over the counter as they would receive meat or groceries from the clerk. Would it not be well to show them what they would have to do in order to get the gas thus purchased into their house pipes that it might be used for lighting and cooking? Wouldn't it be well to show what a nuisance this would all be, and how impracticable is such a method of selling gas? Wouldn't it be well, then, to explain how the gas goes from the works to the holder, the storehouse from which they draw their supply at will? How this gas is delivered to them, day or night, by simply turning the gas key or valve? Wouldn't it be well to explain the necessity of some means of measurement, and how the meter has two measuring diaphragms, comparing them with some familiar object, such as a small hand bellows, the blacksmith's bellows—then showing them in an elementary way how gas can be measured? Wouldn't it be well to show them that we depend upon the gas meter at our works to tell us what coal to buy; show them how we know our meter is correct, and how they can assure themselves that their meter is correct?

Wouldn't it be well to explain why we are satisfied that the meters in town are not slow, and why they could rest even more secure in the belief that they are not fast? Have you ever told your customers how often you test meters, and why you don't test them oftener? Have you ever published a yearly statement of your meter tests, showing that meters are more apt to run slow than fast? Have you ever invited the city council or your customers to come with any gas expert and inspect your method of repairing and testing meters? In other words, have you done anything to popularize the gas meter in the minds of the people in order that complaints might be reduced and your customers be made content with their purchase?

I firmly believe in educating our customers to know all possible concerning the gas meter. I believe that any article, which has for its subject the gas meter, will be eagerly read, and append an advertisement, marked Exhibit A, which recently appeared in our local papers. Exhibit B shows our complaint counter and the meter to the front, and our old friend, "Cook with Gas," not far behind. We should carry always before us that scene behind the bright window I mentioned, and should endeavor to be keepers of the light at the troublesome straits through which the crafts of domestic tranquility must each month pass. Some of the pilots we may find are very near sighted, and others may willfully seek disaster; but if, in the dawn of a new month, we have, through our open and honest methods, succeeded in preserving that picture of the contented home, and have

maintained the confidence of the community, we may then take virtue's reward and enjoy the pleasure, the knowledge of the fact, that the foundations of our institutions have been strengthened, our business has increased, our complaint expense has been reduced, and we have been of very material service to our fellow man.

"EXHIBIT A."—*The Gas Bill; the Gas Meter; the Gas Company.*

In every line of business there are complaints from the customer which must receive the careful attention of the proprietor of the business, and the proprietor of every business should view the complaint from the customer's point of view and endeavor to give satisfaction. No business can hope to prosper when it is managed in an indifferent manner, and the public service corporation is no exception to the rule.

The Atlanta Gas Light Company has 17,000 customers, and its aim is to keep all of these customers satisfied. Rarely do we receive complaints of poor service. When you turn the key or valve, you find gas of good quality there to burn. Atlanta's gas supply has never been cut off. At times there are local troubles. House pipes, getting stopped up with rust, have to be cleaned out, and there are other troubles which, when brought to our notice, receive prompt attention. Troubles of this character cause our customers little annoyance. We can easily please them by doing good work, and by doing the work promptly. The gas bill is practically the only cause of ill-feeling against the gas company. This is not because the price of gas in Atlanta is high, for there is no company in the South which sells manufactured gas cheaper than we do. The trouble seems to be on account of the varying amount of the gas bill. One month the bill will be $4, the next month $6. The customer will often complain that there is no reason for this increase, as he burns the same amount of gas each month; he has the same meals to prepare; the same number in the family, and all retire at the same time. Sometimes there is only a small decrease in the bill, and the customer is dissatisfied because he was away part of the month and expected a larger reduction.

Again, a customer will complain that he is overcharged because his bill is larger than his neighbor's, and he has only four in the family, whereas his neighbor has six. Some say they know their meter is fast, because they can hear it click. Others say they know they didn't burn the gas and there must be a leak. Month after month, year after year, we are receiving complaints such as these. The seeming necessity for these complaints is a source of annoyance to the customer, and we feel that the company should give freely of any information it may have, which will bring to light the true facts, and enable the customer to judge intelligently whether or not a complaint should be made. Every little complaint addressed to the company receives the Manager's personal attention. If it is a complaint about the service, orders are immediately given to have the trouble remedied, if the complaint is on account of large gas bills, a careful investigation is made to see when the meter was set and when it was last tested. A man is sent to re-read the meter to see if a mistake was made. If a mistake was made and the meter was over-read, we explain how the next month's bill will receive credit for the overcharge. If no mistake was made by the meter reader, and the meter is found not to have been in service over 3 years, we write the customer that we are satisfied that the bill is correct; but if he believes the meter is fast—*i. e.*, registering more than it should—we are only too glad to remove the meter and test it. We ask no pay for this work, but do request the presence of the customer, or his representative, to see the test made. It is very seldom that the customer will come, but those who have visited our test department will, we are sure, tell you their confidence in the meter was greatly increased.

Meters are more apt to run slow than fast, and this you can see from the following table showing the results of meter tests made during the year.—ATLANTA GAS LIGHT COMPANY.

"EXHIBIT B."—*Meter Test Report on Meters in Service Three Years.*

Correct.	Fast, 1 Per Cent.	Slow, 1 Per Cent.	Fast, 1 to 3 Per Cent.	Slow, 1 to 3 Per Cent.	Fast, 3 to 4 Per Cent.	Slow, 3 to 4 Per Cent.
4,344	1,324	996	13	41	76	126

Fast, 4 to 6 Per Cent.	Slow, 4 to 6 Per Cent.	Fast, 6 to 8 Per Cent.	Slow, 6 to 8 Per Cent.	Fast, 8 to 10 Per Cent.	Slow, 8 to 10 Per Cent.	Fast, Above 10 Per Cent.	Slow, Above 10 Per Cent.
210	423	15	72	3	81	0	126

Customers getting gas, meters non-registering, 242.

From these figures you will see that of the meters wrong, 1 per cent., there were 328 more fast than slow.

Meters wrong, 1 to 3 per cent.: There were 28 more slow than fast.
Meters wrong, 3 to 4 per cent.: There were 50 more slow than fast.
Meters wrong, 4 to 6 per cent.: There were 143 more slow than fast.
Meters wrong, 6 to 8 per cent.: There were 57 more slow than fast.
Meters wrong, 8 to 10 per cent.: There were 78 more slow than fast.
Meters wrong, over 10 per cent.: None fast, but 126 were slow.

Meters that would not register at all, but gas going to the customer just the same, 242.

From these figures you can also see how important it is, from the Company's standpoint, to remove meters for test at least once in 3 years. You can now note that if we are satisfied that your meter is not slow, how you can rest even more content in the belief that it is not fast? You can see how some of your neighbors may have a much smaller bill than you have. Do you know that many good people in Atlanta come and tell us they know the gas bill is too small, and that the meter must be slow. Some of them consult their ministers before they tell us; but they tell us just the same, and we appreciate their fair treatment. We have never known a gas meter to be more than 10 per cent. fast, but, as you have seen, we removed in 1 year 126 meters which were more than 10 per cent. slow, and 242 meters which did not register at all.

We extend a cordial invitation to any and all of our customers who lack faith in their gas meters to come with any one, first making an engagement with the Manager of the Company, and see the meter tested. Any customer who accepts the invitation, and whose meter is found to be fast, will receive a rebate on the previous 3 months' bills, the amount to be determined by the per cent. of error, if any is found.

If the day ever comes when our customers will feel more confidence in a public meter inspector than they have in their gas company, we hope the meter inspector will be appointed.

We welcome any suggestions which will tend to improve the service. We want you to tell us your gas troubles. We are at your service; our aim is to perfect that service.—ATLANTA GAS LIGHT COMPANY.

During the reading of the paper Mr. Congdon interpolated the following:

I had a new complaint the other day. A woman came to my office and said, "I wish you would send someone to my house. The meter makes a noise that is very annoying. I cannot sleep at night therefor."

In Atlanta the houses do not always have cellars underneath. A great many just have mere openings underneath. As the trouble seemed to occur at night I sent a man to investigate. He found six chickens roosting on the pipe, and every time the chickens would shift, there would be a noise. Thus the trouble was with the chickens and was not with us.

Also the following:

A short time ago a fellow complained about his gas bill. We looked up the record and found the meter had only been in 4 or 5 months. I was satisfied the meter was all right, but I said if he wanted to assure himself, I would have the meter tested. He replied he would be satisfied if I would put in another meter. I wrote I didn't want him to do that; for if I put in another meter, his bill, for some reason, might be much less the next month, which he would attribute to the new meter being accurate and the old one inaccurate. I remarked that as this would be a very bad advertisement for the Company, I could not do it, I would, however, give him my time and test the meter to determine its state. His reply was, "Let the meter stay in." He would not go to the trouble. I think it is a mistake to change meters at the request of customers when you think the meters are correct.

Discussion.

The President - This very fine paper by Mr. Congdon is now open to discussion. As our time is limited and we have a good deal of ground to cover because other papers are to follow, I will ask the participants in this discussion to confine their remarks strictly to the subject in hand. If you start digressing I may have to call you down. Mr. Moore, will you open the discussion?

Mr. Moore—The paper covers the question so thoroughly that I don't know of anything that I can add, except to cite one or two cases in our experience. A Professor in the Austin University, on being asked to use gas, finally concluded he would do so. The first month his bill was about $38, and he came to the office very much wrought

up over it; in fact, was somewhat abusive in his language. I admitted that the bill was much too high, but thought I could convince him that the gas had been burned. Making an engagement to meet him at his house, we went there and tested the meter. I sat outside the house, on the ground, and he did too. The dial was not moving and there was no sign of a leak. I sent a man into the kitchen and told him when I rapped on the window he should light a burner. When we were satisfied there was no leak I rapped on the window and the man lighted the burner, and round went the little test dial, showing gas was passing. I told him to turn it out. He did so and the test dial stood. He saw it all, and I said to him, "Professor, you see no gas gets through the meter unless someone opens a place for it to pass. I don't want you to pay all of that bill and don't expect you to, for it is an outrageously large one. I think the man you have here is burning too much gas. Come to my office and we will get to an adjustment of it." He did so, and I said: "Professor, what do you think would be a just bill?" "Well," he said, "you have convinced me that I burn your gas, and whatever you say will be right." So I cut his bill in two, from $38 to $19. I said to him at the same time, "Now, Professor, I would like to have you give me an order to remove the meter. I cannot take it out unless you order me to take it out as soon as you pay your bill. I would sooner not have you as a consumer since you have that negro in the kitchen." He said, "All right; remove it." I did so. In about two months he asked me to put it back, and I never had any further trouble with him. I had a similar incident with another party. His bill usually amounted to $1.50 a month; suddenly it jumped up to $18. I personally went to the house with the owner; went through the same process above described. When we got through he paid his $18. It seems to me that any effort to convince people that a meter is correct, and that, for some reason or another, they have used this gas or allowed servants to do so unwittingly, will make friends of them. They will see that the meter is correct and will pay the bill. The day before I left to come here a man who had a prepay meter could not understand—did not want to pay the minimum bill for two months. I satisfied him; he won't call any more; he went away satisfied. You can do it all along the line. We had a man who complained every month for 5 years and threatened to quit using gas. I finally said, "Why can't you quit? We can't send a man around to your house all the time to watch the meter. If 5 years of complaint is not satisfactory to you, you had better quit for a while." He quit; but a little while after he bought a new stove, had the prepay meter taken out and a new one put in, and I have had no trouble with him since.

Mr. Frund—Mr. Congdon's paper is certainly an excellent one and full of good meat and valuable information. I want to say, on the line of getting the confidence of our patrons, we practice teaching them the meter as it reads in dollars and cents. We show where it reads on the right hand dot and tell them, "See what you get for your 13 cents." In cases where they ask for removal, we request them to make dial readings for a certain length of time. Our object in that is that they may make comparisons. We teach them what the little 2-5 hand is intended for. It is there for their use—to test whether gas is passing through the meter with every light turned off. Then, that the 2-foot dial is there for the purpose of ascertaining at what rate or number of feet per hour the Welsbach burner or the heater is consuming gas. By so doing they check the dial and get, not only their average, but also what it costs them for fuel during the day in a home or business house, for ironing or other work they may be using it; and it also gives them opportunity to ascertain what the amount of their bill is for light. A man whose bill amounted to an average of $12 a month, about 2 months ago concluded that he could not afford to pay that bill regularly, and ordered the meter out. I requested him to ascertain how much of that bill averaged for lighting, and fuel for the range, and taught him how to average that by taking readings morning, noon and night for a certain length of time. By so doing we kept that customer, and he cut out the gas range, finding out that 75 per cent. of the cost of his gas was due to extravagantly wasteful help. By this method we kept him on our books. Another wanted the meter taken out because he thought it was inaccurate. After getting through teaching him how to test the meter, and ascertain the leaks, we said we would take it out conditionally, that he would come with our meter man to our testing apparatus and see the meter tested. I said, the meter has been in there 4 years and we didn't know how its standing was. There might be a reason why the bill was high. When we get them to visit the meter testing department, which we can do in most cases, then we have a customer who gives us no more trouble. By teaching them how much they are getting for a cent by looking at the dial on the right side, they know how to read the meter, and what it costs them for light and for heat and cooking, by which practice we have created a good feeling between our patrons and the company that has been salutary and of good effect.

Mr. Day—I held a position the last 4 or 5 years which caused me to receive a majority of the complaints from many different people. Some of the members can perhaps answer a query I had the other day. A lady who came in said she did not know why the gas failed to burn in her stove, when the electrical plant burned out around the corner. We have a great many complaints (in fact most of them seem based on such account) of high bills. A method we use in such cases is what we term the complaint meter. This meter is run by clock, as you all know, and shows the hour of the day that the gas is turned on and also the amount used. In this way we have been able to show a customer that gas was used without his knowledge. You are probably all familiar with the conditions we have in the South with negroes using gas. They use it liberally, and sometimes we have to take out meters on that account. In most instances, where we have been able to get people to read their own meters, we have been very successful in satisfying complaints on that line. In other words, they get the dial readings, and in that way they know each day what their bill amounts to, and thus are better able to economize. In conclusion, I am very much impressed with Mr. Congdon's statement going in the newspapers. I think it is a good "stunt." It shows the people we don't mind educating them as to what we are doing.

Mr. Rushin—We have a test meter in Atlanta like that noted by Mr. Day. A while ago a foreman and myself were in a man's house showing him how the meter operated. He sat and looked at it, and afterwards he said, "You can't get ahead of the Company. Here I am now paying for the gas to register the clock in that meter." I said to him, "My friend, do you know how much gas we sell to make the clock go at the City Hall?" He said, "Is that run with gas?" I said, "It is run just the same as that in the meter; the clock in the City Hall is the same kind of a clock, and if we sell the authorities gas to run their clock, then you are paying for the gas for this one." In explaining to people about bills the best way is not to try to think for a man. Let him do the thinking. Ask him the same questions he asks you. Then he will see what a fool he is. That fellow honestly believed before I asked him that, that the gas he was paying for was running the registering clock in the meter. I had never heard that before. That was the only way I had of explaining that to him. I asked him if he had a gas meter attached to his watch or his clock, and if he paid anything for the gas he used to run them, and to show me where his meter was for his watch or clock. Something happened in the office a while ago that I have to tell. I get hold of a few complaints sometimes, but if I don't get these I become lonesome and hungry and hang around the complaint counter. I stood there a number of years and I like it, and sometimes I want a fellow to kick. I get a lot of hot air in my system that I can't hold. Well, a middle-aged woman on walking up to the counter said, "There is something wrong with my meter. I know it just as well as I am living, and it makes a fuss just like a cat. My little girl has lost her cat, and I believe it has fallen into that meter." I called the chief clerk and asked him to let me wait on her. I said, "Lady; do you honestly believe that kitten is turning the meter?" She said, "I do; it has been gone 2 or 3 days, and the meter has been making a noise like a cat since that cat has been gone." I said, "When can I make an engagement with you to find the cat; I believe it is in the meter, myself. There is a lock there, but I will unlock it and we will find the cat." We went there and visited the cellar. There was the meter, and all I said was, "I want you to explain where a cat could get into this meter." She said, "I don't know; it is up to you." I said "I can't; I have been in this business a long time, and I cannot to save my life see where a cat can get into this meter, when nothing but air can get in there, and then only when there is pressure behind it and you open the gas." I lighted the stove. When I got through at the meter, she thanked me and said, "I suppose someone has poisoned the cat." I don't want to add anything to Mr. Congdon's paper, but I want to impress upon you gentlemen what that "ad." did in the papers in Atlanta. We cannot estimate the amount of good it did do. A gentleman used to travel out and in to business every day in the car that I generally caught, who took a special delight in kicking about his gas bills. If I ever saw him first around the corner he did not see me. In fact, he got to be an eyesore to me, and I finally lost all patience with him. He was always howling about his gas bill, and when this "ad." came out in the paper I mailed him four copies.

The first time I saw him after that he said: "Rushin, what did you mail me four copies of that paper for—that hot air you are dispensing around town, all over town?" I said, "Because you would be sure to read it I knew, and I sent it to your house so that your wife would get it. I know you annoy her just as much as you do me about that meter." I said, "Did you see what was in that paper?" He said, "No, I chucked it away." I said, "I knew you would. I wanted you to know that I was interested in you and your domestic affairs and your gas bill. I believe if someone at your house was to steal 5 cents you would spend $25 trying to catch the culprit. I know you and your disposition; have known you for years. You have to kick about something, as you don't know anything else, you kick about an excessive gas bill. Don't ever bother me about your gas bill again." He has not said a word from that day to this. In the next month his bill was twice as large as it has ever been since he was keeping house. He never said a word. I said to him, "Haven't you got a kick on your gas bill?" "No," he said. I said, "Why, it is a good deal more." He said, "My mother-in-law has been over here from St. Louis and we have used a good deal of gas." I said, "Well, I didn't know that." Another thing that happened in our gas business in regard to large bills. I have seen it lots of times, but it never appealed to me as it did in this case. Much of the out-of-town complaints come to Atlanta and are distributed (I don't know whether it is fortunate or unfortunate), but anyway I got this letter. It was headed "Atlanta Gas Light Company: Gentlemen: It is impossible for me to keep house in Atlanta, for my rent bill is so and so, my grocery bill is so and so, my electric bill is so and so, my gas bill so and so. If you don't cut my gas bill down I will have to move out of Atlanta." Going to see him I asked him about it. He told me all about what his wife would pay out and everything else, and I asked, "Did you write to your landlord about your rent? To your grocery man about your grocery bill, to the electric company that your bill was too high? To all of which he answered, "No." Then, I asked, "Why in the world did you write to the gas company?" He said, "Because I thought the gas company would send someone to do something, and that all those other fellows would not." I said, "I am sorry for you; I will put you in a slot meter." He said, "I don't want any." I said, "I want you to do it." He said, "Why?" I said, "You must either do that or make a deposit, because you are going to fail. Your rent is too high. You are living above your income, and you are blaming the gas company. I can't come here every day to try and cut down your gas bill." But I did go there and now he knows as much about gas as I do. He knew he would not get any sympathy from anybody in the world except the gas company, so he appealed to us and got it.

The President—I don't want to cut the discussion, but we have two other papers which are very much in the same line. I think it would be a good idea to have those papers read and then have a discussion for as long a time as we wish upon all three, for they run one into the other distinctly. This paper is on

GAS ADVERTISING,

by Mr. E. D. Brewer, of Atlanta, Ga. In the absence of the author I will ask the Secretary to read the paper.

Judicious advertising is judicious publicity. Advertising, rightly done, will cause customers to have confidence in the gas company and increase the sale of gas by bringing in new customers, and teaching the old ones new ways of using gas. Advertising that creates confidence may be termed policy advertising.

It is policy advertising when a gas company pays its bills promptly, gives every customer a square deal, has politeness for its watchword, views complaints from the customer's angle, and publishes in the public prints its policy. Judging from my own experience, most gas companies save the 2 per cent. on their bills, but if this is the only policy advertising they do, the comment of the creditor may be: "Well, the gas company should pay promptly; for it mulcts the public enough to do it."

A square deal is a "Rooseveltism" that every gas company would do well to adopt, and is given when a representative of a gas company is frank, fair, open-and-above-board, and pleasing and gracious in manner; also when he takes great pains to enlighten and not to deceive or excite a customer.

Politeness is great policy advertising. When an irate customer comes confounded to the complaint counter, and indulges in caustic criticism, then it is that a Taft smile waves away the furrows on the brow of the furious fellow, and plain common sense put in polite phrases makes "Mr. Kicker" a customer and a friend again. The soft, low and plain voice over the telephone suggests to the customer on the wire that good service is at the gas company's end, and that plenty of it is in reserve. Many friends can be made for the gas company by politeness and alertness at the telephone.

Confidence is engendered in the customer when the gas company's manager looks at the subject under discussion from the customer's point of view and is conciliatory in correspondence. A letter rightly worded wins friends for the gas company and is good policy advertising. Even the disagreeable duty of shutting off gas for non-payment may be utilized in advertising to advantage the policy of the company. A good policy advertising shut-off notice is printed entirely in light, plain-faced type, with no underscored words. After stating that the gas company will be obliged to remove the meter and discontinue the supply of gas the company might add that it regrets to do this. As mistakes are sometimes made in the gas office, it is well to add the following: "Kindly compare the amount noted with your account. If any difference should exist, please notify us at once. We will take great pleasure in correcting any error. Respectfully, Gas Company."

As changed and added to above, don't you think the shut-off notice will sound more friendly and tend to advertise a square deal? The rules of the company might be printed on the back of the shut-off notice, so as to permit the customer to review at his pleasure the terms of his contract.

It has been suggested by one wishing to carry this idea a step further that, when the man goes to shut off the gas, he might leave a neatly printed card which will state that the gas company regrets having to discontinue the service on account of non-payment of gas bill, and hopes that the customer will soon be enabled to pay up and have the gas turned on.

Intelligent, careful and pleasant workmen advertise in a splendid manner the policy of a gas company. Good service at the burner is advertising that pays.

The gas bill goes from the company to the customer once a month, and the delivery and payment of same often constitute the only connection between the two, year-in and year-out. Is it any wonder that the gas company is often misunderstood? When the gas company fails to tell, and tell again, its policy and its methods, some enemy of the company does the work. A progressive gas company talks to its customers every day through the local daily paper; and please don't forget that the editor of your local paper is one of your customers. The newspapers are supposed to represent the people; when gas men talk through the papers they are lined up with the people. Even the editor of your local paper will be caught reading your stuff, and in the very nature of things he, having been correctly informed, will sit with pen poised a long time before he will write any attack on your company, or allow it to be done by another, if in his power to prevent. On the other hand, by advertising in the local paper you will please the editor and he will go out of his way to say or write something good of your company.

Gas appliance advertising, when judiciously done, is an ever-present help in selling gas appliances and gas. All kinds of standard gas appliances, connected ready-for-use, in a neat, clean, and commodious gas office or showroom, constitute valuable advertising. A gas company can get much new business through high-grade solicitors that have been properly coached. Great care should always be exercised to have solicitors, as well as printed advertisements, talk plainly and in the language of the people. Stickers on the gas bills each month, telling definitely of some one appliance or article, are splendid advertising.

Local newspaper advertising is, in my opinion, the very best method of reaching the people quickly, effectively and economically. The gas company should follow after the manner of the paper. Tell one thing each day, tell something new each day, never let the same advertisement appear in the same make-up more than once. A good plan is to run a policy advertisement one day and an appliance or coke advertisement the next day.

A gas company that gives the people a square deal, regards reasonable public demands, and hammers these facts into the public's head, day-in and day-out, through its employees and the local newspaper, has little to fear from inimical legislation, and its days should be long and golden; so should its nights.

Vice-President Congdon assumed the Chair and said: The next paper is entitled

SOME THOUGHTS ON NEW BUSINESS AND THE ADVANTAGES OF A SHOWROOM,

by Mr. J. C. Rushin, of Atlanta, Ga.

We have often heard that a corporation has no soul; but each officer of a corporation has a soul and a heart, and, in proportion as the individual at the head of a corporation or private enterprise treats his employees, just so he will be repaid. Lincoln said, "A house divided against itself must fall." If the employees of any institution spend their time in wrangling and quarrelling it means a "divided house," and the house will certainly suffer.

Set a good example to your employees. Take them into your confidence, recognize their ability, advance worthy ones, and you will find everyone, from the office boy to the officers, pulling on the rope in the same direction, and you will get full measure of ability from everyone who signs the payroll. It is impossible to suddenly get a perfect working force. A good organization comes through the process of hard work, patience and time.

Commercial men, there are golden opportunities before you. Do all you are hired to do and a little more, disregard the clock, bend your energies toward doing your work well and advancement should surely follow. There are at all times, in all branches of the gas industry, some things that can be improved upon, and any improvement is a step leading to the higher standard, which means better results to both company and customer.

Fairly good service is so scarce that it is remarkable how quickly it is recognized. The small things in life are the ones that count. The gas company that is not alert to the local conditions, and does not get results out of what once looked like a failure, will soon be as dead as Lot's wife.

Selling goods or soliciting requires careful study. The salesman who makes the greatest success in the long run is the man who has practised truth and established himself to the confidence of his customers.

I believe the best gas solicitors to-day are the ones who have shoveled coal at the works, polished ranges and threaded pipe. Someone may say that the best solicitor of his acquaintance does not know a ¾-inch pipe from a 6-inch main. Such a man may be an exception, but, if even he were acquainted with the different branches of the business, how much better he would be? A solicitor should be well posted on what he is selling, the way gas is manufactured, the way it is distributed, and the way the books are kept. Not a mere smattering idea, but know enough about it to be able to discuss it intelligently.

How many of you managers take your solicitors through the gas works and explain the many little details in the manufacture of gas? How many of you have test meters and put various gas appliances on them and let your solicitors see just what it will cost to operate each appliance, and explain to them the good and bad points, and for what it can best be used? How many of you have your solicitors go out with the workmen of the distribution department and see how different gas appliances are installed? How many of you take your solicitors and complaint clerks to the meter shop and show them the way a gas meter is constructed, and the best and most simple way to instruct a customer to read his own meter? These are a few small things, but should not be overlooked.

Some manufacturers bring all of their salesmen to the factory annually and keep high priced ones in their factory for some time, teaching them the way goods are manufactured. I think this would be a good example for gas companies to follow. Instead of letting their solicitors go during the dull season, they should have them spend this time in the various departments learning the business, and then when they go out they can represent their companies in a credit able manner. To the average customer a gas meter is a necessary evil; about once each month it exceeds the speed limit, and the poor customer is fined for it and the company gets the fine.

I am sorry to say, but nevertheless it is true, that some gas companies do very little toward educating their solicitors in the gas business. They seem to think that if their men get too well posted some other company will get them. In this event the company losing the man will be doing its duty in promoting the gas business.

The man who wears stiff shirts, clean collars, and tailored clothes, is sometimes a little inclined to look down on the man wearing overalls. This should be stopped at once, especially among small companies where all of the employees are personally acquainted. The customer is inclined to believe the man in overalls quicker than the more neatly dressed man. If there is any friction between the departments, the workmen will always avail themselves of the opportunity to knock the other department, thereby showing the customer that the employees fuss among themselves, and the company thus gets a little cheap notoriety.

I believe a high-class solicitor or demonstrator not only benefits the company in the selling of gas appliances alone, but will do a great deal of good in keeping the goodwill of the people, in settling old complaints and in getting former customers to use gas again.

When the Hon. William H. Taft decided to spend the winter in Augusta, Ga., the Atlanta Chamber of Commerce sent him a written invitation to visit its city, but Mr. Taft replied that he would be unable to come. However, the Chamber of Commerce had the Atlanta spirit and would not take "no" for an answer. A special committee of representative citizens was sent to Augusta to extend a personal invitation, and then Mr. Taft agreed to come. So it is with the gas company; a circular may be turned down, but a personal solicitation will get the business.

The Importance of a Display Room to a Gas Company.—The old phrase that gas will be consumed regardless of any effort whatever on the part of the gas company, other than making and placing it in the holder and putting plenty of pressure behind it, has no place in the mind of the up-to-date gas man, and is as dead as the lion that Samson slew. The statement that an article will sell itself has been proven fallacious. Many gas men, who have been in the business since they wore short pants, can well remember when gas company managers would ignore the thought of having a man to sell gas and gas appliances. It was below the dignity of many gas managers to have a man call on the people and try to interest them in his goods.

A gas company that tries to sell gas appliances without the aid of a place where all appliances are practically demonstrated through the use of a test meter is like a mother who tries to get her grown son a position without his presence. Any business man would rather see the son before employing him, and he would like to see a gas appliance demonstrated before buying it. It occurs to me that we gas men have a much better opportunity for displaying and demonstrating our goods than those in any other branch of industry.

For example, take the hardware merchant and the furniture dealer. When a prospective customer enters a hardware store to buy a range the clerk may show him a gasoline, a wood or a coal range; but, mark you one thing, he does not fire up any one of these. He knows too well the aftermath—the oil, the smut, the ashes and the great waste of time. Another thing, the mere firing up of anyone of these appliances will take away the polish and render them second-hand. The furniture dealer may have the most attractive bed to show, but never offers to smooth back the cover and invite you to take a nap.

In our up-to-date demonstrating rooms how different! The demonstrating of any gas appliance, from the smallest to the largest, has absolutely no drawback. On the other hand, the demonstration positively enhances the value of the appliance in the eyes of the prospective customer.

Frequently a person will say: "If I purchase this appliance will I get the one you have shown me in operation." Our Company is always glad to do this, for it pleases the customer and creates a stir in the demonstrating room. Nothing else is so beneficial to a business as a little stir sometimes.

I wish to again state and emphasize that the important feature of a gas demonstrating room is to have all small appliances, such as laboratory burners, chafing dishes, soldering furnaces, tailor irons and hot plates of all sizes, connected up to a test meter to show just how much gas will be used for a given time, and give an idea how much heat can be obtained from the various appliances. This gives the customer a much better idea of the kind of an appliance that will suit his purpose best. Some gas companies will not exchange gas appliances without a small fee, yet will not give the customer an opportunity to see just what he wants before he buys.

No doubt many gas men will say that is all right for the company that has plenty of room. Remember, my friends, wherever there is a will there is a way, and everybody in the world gets everything they want in reason, if they want it very long and bad enough.

Another very important feature in connection with a show room, I think, is having a modern, up-to-date kitchen, with the gas range in the kitchen convenient to the sink and table and the hot water tank heater in its proper place. We should have photographs of such a kitchen made and framed and hung in every architect's, contractor's, builder's and plumber's office in our city; also have cuts, together with good descriptive matter, run in the newspapers. We should have the photographs made and framed so nicely that they will be an ornament to a man's office. I have seen some kitchens where a woman would have to take a great many unnecessary steps while preparing a meal. Call people's attention to this fact, and show them how an up-to-date kitchen should look, and it will be good advertis-

ing. Still another important feature of a showroom is having attractive window displays. How many gas managers are there who would like to have such handsome window displays that they would be the talk of the town?

What are we doing along this line? The majority of us will pay a man to walk the streets, talk bright lights and clean ranges, while the display windows of the gas office are the darkest and most unattractive places in the city. Some of us will have a gas range in our window full of dust and rust with a lot of junk piled on top of it, and then wonder why our salesmen don't get orders.

We might profit by our friends, the National Cash Register Company. Notice its windows, see how often they are changed, and how attractive they are made. In some of its windows I have seen, not a word was said about a cash register, the whole space was taken up in entertaining the public. Again, consider our friends, the sewing machine companies; walk into any one of their offices and you'll find the most delicate fabric in one machine, and in another the coarsest; immediately the current is turned on and the machine is demonstrated.

A gas company's window displays are exceedingly important, and not a particle of dust or rust should be on the appliances, the window glass should be kept crystal clear, the floor spotless, and, to be of any importance, the displays should be changed frequently.

I do not think that we should try to economize too much in displaying and demonstrating our goods, as a pound of demonstration is worth a ton of talk.

I think that gas companies, as a rule, over-estimate the general public's knowledge of gas appliances. I firmly believe that all of our showrooms should have a personality about them that would seem to say: "Come in, you will find a welcome. It is no trouble to answer questions."

You have heard, gentlemen, my ideas on the value of displaying and demonstrating gas appliances, on which subject too much cannot be said.

(To be Continued.)

[Continued from page 685.]

PROCEEDINGS, FIFTH ANNUAL MEETING, ILLINOIS GAS ASSOCIATION.

HELD IN CHICAGO, ILLS., MARCH 17TH AND 18TH, 1909.

FIRST DAY—MORNING SESSION.

The President introduced Mr. Henry I. Lea, of Chicago, who read the following paper on

A NEW METHOD IN WATER GAS MANUFACTURE.

Philosophers tell us that all developments pass through three periods. The first, of course, is the crude beginning; the second is that in which many modifications and adaptations of the original are made for special purposes and in most of which efficiency is sacrificed to expediency; the third is that in which the weak features are eliminated, and a slow, but very sure, approach is made to one common method, which method invariably shows the highest efficiency, all things considered.

Just now our industry seems to be at that stage where the second and third periods overlap, for while our methods of manufacture, distribution, sale and application are being constantly improved we are certainly approaching uniformity in practice. In view of what has been done and is being done, it seems that we should be able to get some indication as to the lines along which we will develop, although we cannot to-day catch this trend of development without considering a good many things not met in the routine operations of the majority of our members. In the matter of gas manufacture this is particularly true; for industrial requirements have brought about the development of important new methods of gas manufacture and application by men almost wholly outside of what we have been pleased to call the "gas business proper."

So short a time as 14 years ago the use of blast furnace gas in engines was considered impossible, yet to-day we find the steel companies throughout the world spending millions of dollars in equipment for the development of power with this gas, which averages between 80 and 90 B.T.U.'s per cubic foot, has only about 25 per cent. by volume of combustible, and actually can be ignited at atmospheric temperature only with difficulty. This blast furnace gas development is traceable to the apparently simple discovery that the secret of the use of blast furnace gas is in compression. The history of producer gas shows also remarkable development of a low grade gas, when properly applied to its work, for to-day we find producer gas of 135 B.T.U.'s per cubic foot used not only in domestic cooking, incandescent lighting and power generation, but, for instance, in the firing of the largest open-hearth furnaces known. Producer gas development shows also the possibility of using a surprisingly wide range of inexpensive raw material in gas manufacture.

The rapid and important development of blue water gas in Europe for high temperature metallurgical work only adds to the evidence showing that there is to-day being done, with gases having less than 300 B.T.U.'s per cubic foot, an extremely wide variety of work which, until a few years ago, was considered possible only with high thermal value gases. The development in connection with vertical retorts abroad confirms the evidence offered by blast furnace and producer gas, of the advantages to be derived from continuous operation.

All the coal gas systems, including horizontal, inclined and vertical retorts, chamber ovens and by-product coke oven plants, and all of the carburetted water gas plants and so-called oil gas plants, are showing conclusively the many thermal losses necessary with intermittent operation and the inadvisability of using fireclay in any form for the transmission or temporary storage of heat. In connection with these latter methods, the widespread agitation for, and the commercial possibilities ahead of, low-priced gas, show the increasing importance of getting away from the relatively high priced raw materials required in their operation. The increasing recognition of thermal value (rather than candle power) as the correct basis of gas rating, opens the way for such changes in the composition of our product as we may find desirable. The developments in high pressure distribution, and the correct application of gases, show the many advantages following the use of pressures higher than common until a few years ago. Because we must ultimately adopt that process which will enable us to give to the public, at a profit, the largest value for the dollar, it seems worth while to note the fact that the developments above referred to not only indicate a widespread tendency toward one common method, but indicate also more or less specifically the detail of that method.

We will all probably agree that the method of manufacture desired in our industry is one which will enable us to produce continuously, from the least expensive fuels, a gas having such characteristics as local conditions may require. In the gas producer field we find at hand the instrument which enables us to utilize the inexpensive fuels with very high thermal efficiencies; but producer gas alone will probably never be used for general distribution successfully, because of its bulk and low flame temperature. This view is confirmed by recent Mond gas experience in England, which, while perhaps not conclusive, is at least important through showing some of the weak spots. By combining producer gas with other gases, however, we enter at once a very promising field.

Many attempts have been made to carburet producer gas, but in every case of which the writer has been able to learn, these attempts have involved intermittent operation with its many disadvantages. As in ordinary coal gas and water gas practice, the disadvantage of passing periodically from one to another bad extreme of temperature in the gas making process applies also to intermittent carburetting of producer gas. It is possible, however, to avoid this objection.

Because producer gas may be made continuously from liquid fuels as well as from solid, it will be seen that producer gas may be considered as a basis for the final product in all parts of the country, and it is the purpose of this paper to show the results we may reasonably expect from the continuous manufacture of a new gaseous mixture, composed of producer gas and hydrocarbons from oils or solids and products of combustion of producer gas. It has always been assumed that the addition of carbon dioxide or of nitrogen to our final product offers nothing but disadvantage. Nevertheless, in view of the many losses due to intermittent operation, the writer has considered the possibility of providing the heat required in carburetting producer gas by burning within the body of producer gas being made a portion of that gas—allowing the products of such combustion to remain in the finished product. In spite of the obvious objection to this last mentioned step, there are accompanying advantages which apparently make the process worthy of serious consideration. The figures which follow, however, must be understood as being only theoretical, although they are based, as far as possible, upon actually known conditions.

Since this process has not yet been actually tried, the writer does not go so far as to say that it is operative, although all of the calcu-

lations made confirm the belief that under many conditions the process here described will yield a satisfactory gas at a much lower cost per unit of heat than is possible with any process now in use.

The equipment necessary in carrying out this process is practically that of a carburetted water gas plant in which the generator is replaced by a producer of the type best adapted to the local fuel, and in which the carburetter is so constructed that the combustion of a portion of the producer gas entering the carburetter will have been completed before the products of combustion will have reached the point of oil admission. The exact construction would, of course, be determined by the costs and characteristics of coals and oils locally, but this general illustration will serve to make clear the scheme of operation. Lack of time has prevented the preparation of other than patent office drawings, which cannot here be shown.

While it is possible, within a certain range, to use solid fuels for carburetting, this possibility is avoided in the following calculations, as involving too many uncertainties. Farther along in this paper will be found summaries of a number of calculations representing working results that seem to be possible with three distinctly different types of producer fuel.

These calculations have been carried out for gases of three different values with each fuel, and although values higher and lower than shown may be made with either of the fuels indicated, the range covered is believed to fully meet all demands now in sight. To make it clear that the summaries given are not entirely based on conjecture, the following calculation is submitted as being typical of all from which the summaries are drawn. Naturally the thermal efficiency of this process, other things being equal, will be highest when the producer gas contains no tarry vapors, as the presence of these vapors makes it necessary to raise the entire body of the producer gas from the temperature at the producer outlet to the temperature of fixing of the oil vapors. With a tar-free producer gas, only that portion necessarily burned will be raised in temperature above that of the producer outlet, the balance of the producer gas in the final product being admitted after the carburetting stage. The following calculation is based upon the assumption that our producer fuel is to be a bituminous coal from mine No. 3 of the Donk Bros. Coal & Coke Company, Troy, Ills. This coal has been carefully tested by the United States Geological Survey at the fuel testing plant in St. Louis, and the following data, as to characteristics of the coal and the producer gas made, are taken from actual practice, as recorded by the Geological Survey in "Producer Gas Test No. 9." The coal shows the following analysis:

Constituents.	Per Cent.
Moisture	12.43
Vol. matter	32.65
Fixed carbon	45.70
Ash	9.22
	100.00
Sulphur	1.41

The thermal value of this coal as fired is 11,237 B.T.U.'s per pound. The producer gas made shows the following analysis:

Components.	Per Cent.
CO_2	9.72
O_2	0.12
CO	15.12
H_2	9.98
CH_4	6.00
N_2	59.06
	100.00

The thermal value of this gas is 151.5 B.T.U.'s per cubic foot, corrected to 60° F. and 30 inches barometer.

Gas made per pound of coal as fired equals 51.5 cubic feet.

Thermal efficiency of producer operation equals 68.86 per cent.

There is good reason to believe that that efficiency can be considerably improved in regular practice, but this figure is taken because it is the actual result of operation. The gas leaves the producer at an average temperature of 882° F. and the tar recovered equals 5 per cent. (by weight) of the coal used. The oil used in this calculation is Beaumont, of 22° B. The United States Naval Liquid Fuel Board, acting under Rear-Admiral Geo. W. Melville, has conclusively shown this oil to have an average thermal value of 19,224 B.T.U.'s per pound. Water gas practice has shown that permanent fixing of the average oil into desirable gases may be accomplished below 1,450° F., when carburetter and superheater have sufficient capacity.

The average product of destructive distillation of gas oil in the presence of inert gases at the correct temperatures may be shown to be as follows:

Components.	Per Cent.
CO_2	1.266
C_2H_4 (equivalent)	42.627
CH_4	49.488
H_2	6.169
N_2	0.450
	100.000

The thermal value of this gas at 60° F. and 30 inches barometer is 1,612.2 B.T.U. per cubic feet. The oil above specified will yield the equivalent of 86.771 cubic feet of this gas per gallon or 11.3278 cubic feet per pound. Good water gas practice shows that, of the oil used, only 8 per cent. remains unaccounted-for. Because the formation of tar may be entirely, and the formation of lampblack almost entirely avoided by continuous operation under correct conditions of temperature and pressure, it seems reasonable to assume that we can attain a thermal efficiency of 95 per cent. in the gasification of oil in the presence of inert gases which themselves supply the required heat and temperature. To avoid unnecessary details, we will assume that we now have our plant in operation, with the producer fuel bed and the carburetter and superheater at the desired temperatures. Because the sensible heat of the producer gas entering the carburetter is not alone sufficient for fixing the desired amount of oil vapor, we must burn that amount of producer gas which will supply the difference.

We will assume that the gas we desire to make shall have about 675 B.T.U.'s per cubic foot To attain this value we will have to have in our finished product 76.65 cubic feet of oil gas for each 51.1 cubic feet of producer gas remaining as such in the final product. As a convenient base the 51.1 cubic feet of producer gas made per pound of coal is here used. The heat it is now necessary to supply, in addition to the sensible heat of the producer gas, will be as follows: To raise 51.1 cubic feet of this producer gas from 882° F. to 1,450° F., we require 547 B.T.U. To raise 76.65 cubic feet of this oil gas from 250° (which temperature is reached by utilizing waste heat) to 1,450° F., will require 2,785° B.T.U. To raise .05 pound of tar vapor from 882° to 1,450° will require 13 B.T.U. The heat rendered latent in making the above oil gas equals 2,355 B.T.U. The heat rendered latent in gasifying the above tar vapor equals 17 B.T.U. The total of the above requirements is 5,717 B.T.U.

Water gas practice shows that the loss of heat by radiation and convection need not exceed 9 per cent., even with intermittent operation. Adding 9 per cent. to 5,717, we have 6,232 B.T.U.'s to be provided by the actual combustion of a portion of the producer gas entering the carburetter. The value of this producer gas at 882° F. is 167.8 B.T.U.'s per cubic foot, corrected. To provide 6,232 B.T.U.'s we must, therefore, burn 37,134 cubic feet of this producer gas. Because the air admitted to this producer gas will be under absolute and automatic concontrol, the resulting products of combustion may be calculated very closely and shown to be as follows:

CO_2	11.452 cubic feet.
N_2	56.027 "
H_2O	8.162 "

The water vapor, of course, will condense and is not carried further in our calculation. It is assumed that the tar gas will be composed of practically equal volumes of H_2 and CH_4, and the uncertainty in this connection is covered by an allowance of volume very much less than probably would be obtained in practice.

The original volumes of producer gas, and the products of combustion of the additional producer gas burned, having now been given the temperature and volume of heat required in fixing the desired amount of oil, they are carried forward to the point of oil admission, where they are mechanically mixed with the oil vapors continuously and automatically introduced. On passing through the carburetter and superheater the oil vapors are now fixed into desirable permanent gases by the heat and temperature supplied by the producer gas and products of combustion. Because of the very intimate contact of this source of heat with every vesicle of oil admitted, this transfer of heat will be very effective, and at the outlet of the superheater we should find the following gases and thermal values:

	Total, Cu. Ft.	Total, B.T.U.
Original producer gas (51.1—.06O)	51.04	7,742
Products of combustion	67.48	0
Oil gas	76.65	123,575
Tar gas	1.00	667
	196.17	131,984

The average thermal value of this gas is 672.75 B.T.U.'s per cubic foot, and its analysis should be as follows:

CO_2	8.88	per cent.
CO	3.68	"
H_2	5.27	"
CH_4	21.20	"
C_2H_4 (equivalent)	16.74	"
N_2	44.23	"
	100.00	"

This gas contains 46.89 per cent. combustible by volume. The air admitted for secondary combustion in the above operation will have been 43.106 cubic feet. The weight of the above gas is .076897 pound per cubic foot, and its specific gravity at 32° F. and 30 inches barometer is, therefore, .9525.

The combustion of a cubic foot of this finished gas will require 5.841 cubic feet of air and will yield the following products:

	Cubic Feet.
H_2O	0.9789
CO_2	0.8398
N_2	5.0627

The net heating value of this gas is found to be 623.07 B.T.U. The heat required to raise the products of combustion of 1 cubic foot of this gas 1° F. equals .192816 B.T.U.'s. The flame temperature is, therefore, 3,231° F. To produce 196.17 cubic feet of this 672.75 B.T.U. gas, we have used:

1 lb. of bituminous coal = 11,237 B.T.U. (51.1 cu. ft. producer gas).
0.7266 lb. bituminous coal = 8,165 B.T.U. (37.134 cu. ft. producer gas).
6.7665 lbs. oil = 130,079 B.T.U. (76.65 cu. ft. oil gas).
Total = 149,481 B.T.U. employed in the process.

The gas produced contains 131,963 B.T.U., and the thermal efficiency of our operation, aside from the raising of steam and the operation of auxiliaries, is, therefore, 88.28 per cent. Reducing the foregoing figures to the basis of 1,000 cubic feet of finished gas, we find that we have made 1,000 feet of this gas by consuming 8.8 pounds of bituminous coal in the producer and 4.372 gallons of oil in the carburetter. Per 1,000 feet of finished gas, we have made a total of 449.78 cubic feet of producer gas, of which we burned 189 3 cubic feet in the carburetter. To burn this amount of gas we admitted 220 cubic feet of air for secondary combustion. For the operation of the producer, we admitted to the fuel bed something less than 335 cubic feet of air and 6.86 pounds of steam.

It will be noticed that the volumes of air and steam required per 1,000 cubic feet of finished gas are considerably below the requirements of water gas practice and, as there are no auxiliaries not required by water gas, these advantages are clearly with this process as against water gas. As the above coal can be bought in Chicago for less than $2 per ton and the above oil or its equivalent at not to exceed 3½ cents per gallon, we have a total cost for raw material per 1,000 cubic feet of 672 B.T.U. gas in the holder, of $.1618. As the process is continuous, the labor charge will be considerably below that of coal gas or of water gas per 1,000 cubic feet.

Also, because of the continuous operation, the life of the linings and checkerbrick will be very much greater than the life of water gas linings or of coal gas retorts. With the prices for raw material assumed above, this gas would yield 41,579 B.T.U. for 1 cent's worth of raw material.

If water gas of this value were made from the same amount of oil, at the same price, and 35 pounds of coke, at $4 per ton, the cost per 1,000 for raw material would be $ 223, the B.T.U. delivered at plant for 1 cent's worth of raw material would be 30,134, and the steam and air required would be about 16 pounds, and 2,450 cubic feet, respectively. The specific gravity of this gas is, of course, against it, although the additional cost of distribution on that account will be extremely difficult to discover in actual operation, and offers no disadvantage whatever at the point of application, under high pressure distribution. A given holder will, of course, throw a higher pressure with this gas than with a lighter one, but we wno ave abundant experience showing economies traceable to compression to many pounds above atmospheric. The increased efficiency with which the lower value gases may be made, and the constantly increasing range in which the lower value gases are being successfully employed, explain the presentation here of data in connection with gases as low as 288 B.T.U., as it is the belief of the writer that we will certainly find a great many sets of conditions where it will be advisable, from the standpoint of the consumer as well as that of the company, to supply a gas of considerably less than 600 B.T.U.'s per cubic foot.

It is not claimed that the process here described is applicable to all conditions, nor is it claimed that the present details of gas manufacture are not now being carried out along the best lines possible with present processes. The only claim made is that the above process involves a new method of gas manufacture, which may or may not be shown of value in practice, and it is here laid before this convention in the hope that it may in some way assist in bringing our industry to that state of technical development which we all hope to attain.

In the following tables are summarized the results of some of the many calculations made by the writer in connection with this new method of gas manufacture, and they all show operating results which, if obtainable in practice, will certainly make this method of great importance to our industry. Particularly in view of our present knowledge as to the possibility of using low thermal value gas in connection with high pressure distribution, for all of the work now being done with high thermal value gases, it is the firm conviction of the writer that the method of manufacture here outlined is worthy of exhaustive trial.

The following tables will be found self-explanatory, and will enable the reader to approximate the possible saving under his own local conditions. Since producer gas may be made from oil, wood, peat, lignite, steam coal, gas coal, charcoal, coke and anthracite of all grades met in commercial dealing, and from ordinary garbage as collected from the alleys of cities, it will be seen that the field for this method of gas manufacture, should experiment prove it successful, is extremely wide.

Assume that gas is to be made by this process from Texas lignite and Beaumont oil, having following characteristics. Analyses of lignite from mines No. 1 and No. 2 of the Consumers' Lignite Company, at Hoyt, Wood county, Tex.:

Proximate.	Per Cent.	Ultimate.	Per Cent.
Moisture	33.71	H_2	6.79
Volatile matter	29.25	C	42.52
Fixed carbon	29.76	N_2	0.79
Ash	7.28	O_2	42.09
		S	0.53
		Ash	7.28
	100.00		100.00

Thermal value of this lignite as fired = 7,348 B.T.U.'s per pound.

Producer gas made from this lignite by U. S. Geological Survey at St. Louis in Producer Gas Test No. 18:

	Per Cent.
CO_2	9.6
O_2	0.20
CO	18.22
H_2	9.63
CH_4	4.81
N_2	57.54
	100.00

Thermal value of this producer gas = 156.2 B.T.U.'s per cubic foot.

Producer gas made per pound lignite as fired = 34.2 cubic feet.

Thermal efficiency of producer gas making = 72.7 per cent.

Beaumont oil used — 22° B.

Thermal value of this oil, as determined by U. S. Naval Liquid Fuel Board = 19,224 B.T.U.'s per pound.

Average gas made on destructive distillation of gas oil in presence of inert gases:

	Per Cent.
CO_2	1.266
C_2H_4 (equivalent)	42.627
CH_4	49.488
H_2	6.169
N_2	0.450
	100.000

Thermal value of oil gas = 1,612.2 B.T.U.'s per cubic foot.

Oil gas made per pound of oil = 11.3278 cubic feet.

Thermal efficiency of oil transformation = 95 per cent.

Results to be Expected per 1,000 Cubic Feet Finished Gas.

	664 B.T.U. Gas.	462.55 B.T.U. Gas.	288.85 B.T.U. Gas.
Analysis of final product:			
Per Cent.			
CO_2	9.449	10.075	10.56
CO	4.675	8.664	12.12
H_2	5.123	6.421	7.55
CH_4	20.552	14.415	9.16
C_2H_4	16.408	10.136	4.72
N_2	43.793	50.289	55.89
Combustible by volume, per cent	46.758	39.635	33.55
Specific gravity at 30″ and 32° F.	0 9704	0 9578	0.9460
Volumes required for combustion	5.733	3.92	2.363
Flame temperature, degs. F.	3,161 000	3,028.00	2,788.00
Pounds lignite used in producer	13.325	18.54	23.07
Gallons oil used in carburetter	4.44	2.75	1.277
Cu. ft. producer gas burned in process	199.00	158.9	123.8
Cu. ft. air for secondary combustion	219.9	173.0	131.9
Cu. ft. producer gas made	455.73	635.0	789.0
Cu. ft. air supplied to producer	331.25	462.0	573.8
Pounds steam supplied to producer	7.4	10.3	12.83
B.T.U.'s obtained from 1 cent's worth of raw material, assuming oil to cost 3 cents per gallon, lignite to cost $1.25 per 2,000 lbs. delivered	46,919.00	49,096.00	54,801.00
Thermal efficiency of process, aside from raising of steam and operation of auxiliaries, per cent	88.43	85.68	80.76

Assume that gas by this process is to be made from Illinois coal and Beaumont oil of following characteristics:

Analysis of Coal.[1]

	Per Cent.
Moisture	12.43
Volatile matter	32.65
Fixed carbon	45.70
Ash	9.22
	100.00

Sulphur—1.41.

Thermal value of this coal as fired, 11,237 B.T.U.'s per pound.

Producer gas made from this coal by U. S. Geol. Survey, at St. Louis, in Producer Gas Test No. 9:

	Per Cent.
CO_2	9.72
O_2	0.12
CO	15.12
H_2	9.98
CH_4	6.00
N_2	59.06
	100.00

Thermal value of this producer gas = 151.5 B.T.U.'s per cu. ft.

Producer gas made per pound coal as fired = 51.1 cu. ft.

Thermal efficiency of producer gas making = 68.86 per cent.

Beaumont oil used, 22° B.

Thermal value of this oil as determined by U. S. Naval Liquid Fuel Board = 19,224 B.T.U.'s per pound.

Average gas made on destructive distillation of gas oil in presence of inert gases:

Per Cent		Per Cent.	
CO_2	1.266	C_2H_4	42.627
CH_4	49.488	H_2	6.169
N_2	0.450		
			100.000

Thermal value of oil gas = 1,612.2 B.T.U.'s per cu. ft.

Oil gas made per pound of oil = 11.3278 cu. ft.

Thermal efficiency of oil transformation = 95 per cent.

Assume that gas is to be made by this process (see table at top of following column) from anthracite coal (No. 1 buckwheat) and oil having following characteristics:

Per Cent.		Per Cent.	
Moisture	6.56	Fixed carbon	69.51
Volatile matter	8.49	Ash	15.44
			100.00

This coal has value of 11,036 B.T.U.'s per pound and regularly yields, in a large producer plant, 64.15 cubic feet of producer gas per pound fired.

1. Mine No. 3, Dunk Brothers Coal and Coke Co., Troy, Ills.

Results to be Expected per 1,000 Cubic Feet Finished Gas.

	672.75 B.T.U. Gas.	480.22 B.T.U. Gas.	288.14 B.T.U. Gas.
Analysis of final product:			
Per Cent.			
CO_2	8.88	9.381	10.02
CO	3.68	7.502	10.49
H_2	5.27	6.862	8.11
CH_4	21.20	15.635	10.37
C_2H_4	16.74	10.577	4 94
N_2	44.23	50.043	56.07
Combustible, by volume, per cent.	46.89	40.576	33.91
Specific gravity at 30″ and 32° F.	0.9525	0.9468	0.9340
Volumes air required for combustion.	5.8415	4.0365	2.4906
Flame temperature, degs. F.	3,231.00	3,042.00	2,804.00
Pounds coal used in producer	8.80	12.403	15.559
Gallons oil used in carburetter	4.372	2.859	1.334
Cu. ft. producer gas burned in process.	189.3	137.6	101.37
Cu. ft. air for secondary combustion.	220.00	151.96	114.51
Cu. ft. producer gas made	449.78	633.82	795.09
Cu. ft. air supplied to producer	335.84	473.25	593.67
Pounds steam supplied to producer	6.864	9.674	12.136
B.T.U.'s obtained from 1 cent's worth of raw material, assuming coal to cost $2 per 2,000 pounds, and oil to cost 3½ cents per gallon, delivered.	41,579.00	42.698.00	47,855.00
Thermal efficiency of process, aside from raising of steam and operation of auxiliaries, per cent	88.28	85.69	80.28

This gas leaves producer at 850° F., and has following composition:

Per Cent.		Per Cent.	
CO_2	8.3	CH_4	1.4
CO	24.9	N_2	50.1
H_2	15.3		
			100.0

Thermal value of this gas is 136 B.T.U.'s per cubic foot.

Producer efficiency = 79.05 per cent.

Beaumont oil used—22° B.

Thermal value of this oil as determined by U. S. Naval Liquid Fuel Board = 19,224 B.T.U.'s per pound.

Average gas made on destructive distillation of gas oil in presence of inert gases:

Per Cent.		Per Cent.	
CO_2	1.266	H_2	6.169
C_2H_4 (equivalent)	42.627	N_2	0.450
			100.000

Thermal value of oil gas = 1,612.2 B.T.U.'s per cubic foot.

Oil gas made per pound of oil = 11.3278 cubic feet.

Thermal efficiency of oil transformation = 95 per cent.

Results to be Expected per 1,000 Cubic Feet Finished Gas.

	666.55 B.T.U Gas.	465.31 B.T.U. Gas.	300.65 B.T.U. Gas.
Analysis of final product—			
Per Cent.			
CO_2	9.2	8.99	8.64
CO	6.9	13.70	19.30
H	6.7	9.91	12.60
CH_4	19.7	12.76	7.08
C_2H_4	16.7	10.33	5.17
N_2	40.8	44.31	47.21
Combustible, by volume (per cent.)	50.0	46 70	44.15
Specific gravity at 30″ and 32° F.	0.9462	0.9260	0.8991
Volumes air required for combustion.	5.805	4.008	2.553
Flame temperature (degs. F.)	3,187.00	3,094.00	2,903.00
Pounds coal used in producer.	7.273	10.427	13.008
Gallons oil used in carburetter	4.502	2.794	1.397
Cu. ft. producer gas burned in process.	191.6	118.92	59.46
Cu. ft. air for secondary combustion.	218.07	135.35	67.67
Cu. ft. producer gas made	466.6	668.92	834.46
Cu. ft. air supplied to producer.	295.46	443.54	538.46
Pounds steam supplied to producer.	4.36	6.25	7.80
B.T.U.'s obtained from 1 cent's worth of raw material, assuming anthracite coal to cost $2 per 2,000 pounds, and oil to cost 3½ cents per gallon, delivered.	40,422.00	43,004.00	48,491.00
Thermal efficiency of process, aside from raising of steam and operation of auxiliaries, per cent.	89.68	88.36	86.07

(To be Continued.)

April Meeting, New York Section, Illuminating Engineering Society.

The April meeting was held on Thursday, the 15th inst., at the Engineering Society's Building, 29 West 39th street, with Prof. E. L. Elliott in the chair. After the routine business had been taken care of Mr. H. Thurston Owens, of the Committee on Papers, proposed that the general Society be invited to hold its annual convention in New York city, at the time of the Hudson Centennial, early in October, which was duly consented to and authorized. The custom of presenting two papers was continued, the first being on "The Calculation and Design of Illumination," by Mr. Alfred A. Wohlauer. In it the author called attention to the small amount of data available for the calculation of illumination, and stated that, in the majority of of cases where calculations were necessary, uniform illumination was the chief desideratum. After a short explanation of the various factors, he referred to the formula which he introduced nearly a year ago, covering the number of lamps necessary to obtain uniform illumination.

Formula—

$$N = \frac{I \times S}{A \times Ls}$$

Where:

N = number.
I = intensity of illumination.
S = surface in square feet.
A = factor of absorption by reflectors.
Ls = Mean spherical candle power.

He criticized "the lumens per watt" formula," brought out by Messrs. Cravath and Lansingh, in that it referred to the lamp efficiency; whereas the above formula refers to the efficiency of the installation. He stated that reflections from walls and ceiling need only be considered in small rooms, for in large rooms this was a negligible quantity, owing to the decrease in efficiency chargeable to dust, etc.

He also called attention to the fact that, where a high suspension and large number of lamps are employed, the type of reflector did not matter, for as the light would overlap, it was simply a question of the efficiency of the reflector that determined the number of lamps to be used.

Light sources are usually points for circles, whereas objects to be illuminated are usually in square or rectangular shapes, which make it difficult to obtain absolute uniformity in the intensity of illumination.

The second paper of the evening was presented by Mr. Norman Macbeth, who spoke on "The Efficiency of the Small Mantle Burner." The burner under discussion consisted of a single unit, comprised of burner, mantle and mica chimney, which has a horizontal candle power of 47.6, consuming 1.66 cubic feet of gas per hour at a pressure of 2½ inches, and known as the Welsbach Junior.

The author presented a chart showing the lumens per 100 feet of gas, and the lumens per watt, as compared with other gas and electric illuminants, among which were the following:

8-candle power 3.5-watt carbon incandescent ...	3,140
40-candle power 1.25-watt tungsten incandescent..	7,690
Small upright gas lamp.....	26,250
Large " " "	23,300
Inverted gas lamps.....	20,400

Another chart showing the effect of pressure upon the small burner was presented:

	Consumption of Gas. Per Cent.	Amount of Flux Per Cent.
From 1 inch to 2 inches, increase.....	6	15
" 1 " 3 " "	12	34
" 1 " 4 " "	21	46
" 1 " 5 " "	28	57

Referring to candle power depreciation the author stated that tests made of a Welsbach and a cheap mantle showed the following results:

	Welsbach, Per Cent.	Cheap Mantle, Per Cent.
For the first 100 hours.....	10	11.8
100 to 250 hours.....	6	9.5
250 to 500 hours..... ...	12	22.6
500 to 1,000 hours..... ..	8	52 5

During the discussion Mr. Lansingh referred to a paper which he presented some time ago covering specifications for the testing of gas mantles and desired to know if anything had been done along those lines. Mr. Macbeth replied that, although nothing had been done it was undoubtedly desirable that specifications be adopted.

Mr. Owens stated that probably the reason nothing had been done along these lines was because mantles are being continually improved and that, owing to the wide discrepancy between the cost of gas and electric lighting, the custom was becoming general among gas companies to maintain lamps on a rental basis, under which arrangement the prices amply covered even the poor quality of mantle.

Mr. Miller criticized the figures presented by Mr. Macbeth as being laboratory conditions, not those of actual service, where the effect of changes in pressure manifestly altered the conditions. In reply Mr. Owens stated that gas pressures were maintained in a manner comparable with voltage regulation, and Mr. Millar then called attention to a number of tests which he had recently made in a number of central stations where the voltage regulation had not altered over 5 per cent. Then Mr. Macbeth stated that he had made voltage tests in one of the cities shortly after Mr. Millar's visit, only to find the above statement quite wide of the mark. He suggested that perhaps the company employed more men on the switchboards while Mr. Millar's tests were in progress, and also that it was not a question of percentage, due to the fact that in the case of carbon lamps 90 per cent. of the life was lost if the voltage is increased 10 per cent., whereas gas mantles will stand many times this amount. Somewhat similar testimony was also offered by Mr. Bassett Jones.

The May meeting is to be held in the 22d Regiment Armory, in connection with a municipal art exhibit, when Professor E. L. Elliott will read a paper on "Art in Exterior Lighting," the date being May 6th. Invitations have been extended to a number of societies and others indirectly interested. There will be an exhibit of lighting appliances in connection with the "main show."

The Removal of Bisulphide of Carbon.

The *Gas World* reports that Dr. Adolf Samtleben, of Bernburg, Prussia, in an article contributed to the *Journal für Gas Beleuchtung*, remarks that the complete removal of bisulphide of carbon from gas has proved a hard nut to crack. Many attempts have been made with but poor success. The English gas industry has been most prominent in these endeavors; German coal occasions little worry in this respect. Of two coals, it is by no means necessarily the one which contains the greater proportion of sulphur which gives the greater proportion of sulphur in the gas; but there is a tendency for it to give the greater proportion of bisulphide of carbon. For example, a Westphalian coal (0.75 per cent. of sulphur), a Durham (1.30), and a Yorkshire (1.62), gave gas containing, respectively, 17, 34, and 39.6 grains of bisulphide of carbon per 100 cubic feet. The greatest of these quantities is insignificant from the hygienic point of view; for from this point of view 1 per cent. of sulphurous acid in the air breathed does no harm at all. The objection to sulphur in the gas is rather on secondary grounds—the imbibition of traces of sulphuric acid by hangings and the like, with corrosion and change of color in these; or the well known case of the corrosion of leather bindings of books in the library of the Athenæum Club, London.

Witzeck collected the methods tried for removal of CS_2 (*Journal für Gasbeleuchtung*, 1903, pp. 21, 41, *et seq.*). In England, lime purification has been much in use; $CaH_2O_2 + H_2S = H_2O + Ca\,HO\,HS$; and then $Ca\,HO\,HS + CS_2 = H_2O + CaCS_2$. The operation is fairly successful, and the removal fairly complete, if the temperature be high—several hundred degrees; but this would be inconvenient and costly.

There would seem to be nothing for it but to scrub the CS_2 out; the idea of this is to be found in the British patent 699, 1862. The author has made a series of tests, in a washing tube of about 2 liters capacity, on various absorbents which have been proposed for bisulphide of carbon in gas. The washing tube was fitted up as a miniature scrubber, through which the liquid trickled down into a reservoir beneath, from which it was periodically removed and restored to the cistern at the top. The quantity of liquid used was in each case from 2,320 to 3,090 grains, and the experiments were very deliberate, the amount of gas passed being in every case only 3.53 cubic feet per hour.

Scrubbing with Aniline.—Pippig and Trachmann (German patent 119,884, 1901) proposed to treat the gas with a solution of aniline, in presence of a trace of free sulphur; $CS_2 + 2C_6H_5NH_2 = H_2S + CS$

$(NHC_6H_5)_2$, sulphocarbanilide, barely soluble in water. This has been tried, in practice, but has not given satisfaction; in the washing tube the CS_2 is reduced from 35½ to 25½ grains per 100 cubic feet, that is, when alcohol is used to dissolve the aniline. Frank (*Journal für Gasbeleuchtung*, 1903, p. 488) used anthracene oil, heavy benzols, and tar bases to carry the aniline; but with his mixtures the author obtained very slightly better results only. Chinoline, from the tar, being itself, to some extent, an absorbent of CS_2, was also used alone as the vehicle for the aniline, and then about half the CS_2 is removed, but, unfortunately, the absorptive power very rapidly fell off.

With Amines.—In the Rositz Sugar Refinery Company's patent (German, 157,563, 1905), an oily tar from the distillation of molasses was proposed, mixed with various organic compounds; but the material specified has proved unobtainable. The cause of the absorptive power, if any, would be the presence of aliphatic amines in the distillation products of molasses; for example (Blennard), trimethylamine, $N(CH_3)_3 + CS_2 = N(CH_3)_3CS_2$, a solid melting at 257° F. Trimethylamine, which is obtainable as a 33 per cent. solution in water, was tried in that form; result, a reduction from 36 2 to 30.7 grains. This was, therefore, no good, and tertiary amines of the aromatic series did no better.

With Phenylhydrazine.—Liebermann von Segewitz has used phenylhydrazine for analytical determinations of CS_2, with which it very actively combines. Phenylhydrazine is a solid below 73.6° F. It was tried dissolved in chinoline; a 10 per cent. solution took out 53.9 per cent. of the CS_2, a 20 per cent. 60 per cent., a 40 per cent. solution 74.1, and a 75 per cent. solution took out 81.7 per cent. of the CS_2. This is a good deal more promising, and large scale experiments seem worth trying. The solvent must, however, have a high boiling point; and it seems doubtful whether chinoline meets the requirements of the case. For this reason, some heavy anthracene oil was next added, three parts of this to one of the 75 per cent. solution of phenylhydrazine in chinoline; then with 2,778 grains of this, 422 cubic feet had CS_2 removed by percentages falling from 58.2 to 49.8; but beyond that the percentage of CS_2 removed fell to 28.3 at 565 cubic feet, and to 20.5 at 707. The phenylhydrazine becomes exhausted. The gas subjected to this treatment contained 38.2 grains CS_2 per 100 cubic feet, and each grain of CS_2 absorbed removes about 3 grains of phenylhydrazine.

This process might prove useful on a working scale, particularly if a rotary washer were used. It seems worth trying whether the chinoline solution of phenylhydrazine can be used without the addition of anthracene oil, whether the addition of anthracene oil is an advantage, what is the best position for the washer, and whether such a washer could be combined with the naphthaline washer.

But, after all, the question would have to be faced, is it worth while? The materials are not cheap; costs of purification would be increased, the existing proportions of CS_2 give rise to no complaints, and, in these days of vertical retorts, the proportion of CS_2 in gas is falling back by 40 per cent., as it is, as compared with the CS_2 in the yields from horizontal and inclined retorts.

Special English Correspondence.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, April 10th, 1909.

The Make and Sale of Coke.—The Legalization of the Calorimeter.

Attention has lately been directed, by a paper read by Mr. Robert Watson before the Manchester Institution of Gas Engineers, to the varying results obtained at different gas works in respect to coke made and coke sold per ton of coal carbonized. Some of these variations are evidently due to the degree of honesty practiced in the matter of adding water to coke. Everybody knows that it is a serious affair if the coke is not thoroughly extinguished, and if a sufficient quantity of water should be used to avoid danger, and loss or damage to the coke by way of partial combustion, which not only means loss of weight, but unsightly appearance and an excessive degree of ash in the remainder. But between that and something over 10 per cent. of water in the article as sold there is a broad margin representing water added expressly for the purpose of increasing the weight, which, to put the thing bluntly, amounts to barefaced and dishonest adulteration and fraud. Mr. Watson suggests, and it is practically admitted, that the sale of genuine coke and breeze, after providing for the retort house requirement, cannot (and one might add) should not very greatly exceed 10 cwt. per ton of coal. As much was generally accepted, and it follows that, when we find engineers claiming to sell 12 or even 13 cwt. of coke per ton of coal, that they refer, not to coke, but to "coke and water." It is innocently acknowledged that in some districts coke has a "bad name," or that there is a "prejudice against it." If a coal merchant sold coal containing 2 cwt. or upwards of water per ton, he would not be likely to get many testimonials as to its superior quality. And the same thing applies to coke. Customers who are supplied with "coke and water" perhaps are not actually aware of the extent of the loss, but they are likely to make comparisons between it and anthracite coal, which will result in a "prejudice" against coke and in favor of coal. The subject of increasing home sales was under consideration, and, apart from the question of honesty involved, obviously one way of increasing its popularity is to see that it is reasonably dry. Instead of purposely adding excess of water, or stacking it out in the open to get all the rain that it will absorb, it might be a better plan to store it under cover and in the dry. Or as I have before remarked, the coke might be smothered in closed vessels without addition of water. There would be a loss on the weight sold, but against that the superior quality would probably secure better prices.

One peculiar feature is that Mr. Watson's inquiries elicit the fact that a large proportion of gas works are still without breaking machinery. The advantages of supplying coke of a size suited to domestic consumption, and for small stoves, either open or closed, are so well known, and have been so frequently set forth, that this is a matter for surprise. It is evident that many have in the past, and still are, for that matter, directing all their energies to the sale of gas, and that the coke has been left to take care of itself. This fact, together with increasing production, may account for the large parcels which are thrown on the market at take-it-away rates, instead of a figure commensurate with the fuel value, to the great prejudice and injury of the trade as a whole. I have repeatedly showed that with proper management the people who buy the gas will also buy the coke, and that at a very much better figure than can be obtained by dumping it at a distance of 50 or even 100 miles, and this assertion is fully substantiated. It is not too much to say, under ordinary circumstances, engineers having large surplus parcels to offer outside the district are not only an injury to the gas interests at large, but in a greater extent to the real advantage of their own undertaking.

An interesting departure has been the establishing of a parallel between coke and the automatic meter department by offering it in small parcels. Some of the London Companies have inaugurated the practice of putting up 28-pound lots in strong manilla paper bags and delivering the same in the district, or supplying to coal dealers at a fixed price. The convenience of this plan in towns where the houses are let in flats, either for business or for residential purposes, is obvious. The bags can easily be conveyed to the top floor and stored in any odd corner. But this plan represents a considerable addition to the cost of delivery. The bags themselves, to begin with, cost a halfpenny each. The expense of loading, weighing, closing up and extra cartage would mean another halfpenny. So that to clear expenses the bags must be sold at 30 per cent. or more in advance of the price per ton. One advantage is that it secures to the customer a fairly dry coke. The plan cannot be recommended to those who sell 13 cwt. per ton of coal, because if sufficiently damp to moisten the bags they will soon be reduced to rotten pulp.

The sale of coke is in a more advanced stage on the Continent than in Englaud. There it is no uncommon thing to find it assorted into 4 or even 6 different sizes, and the small fetches nearly as good a price as the large, whereas here it is usually got rid of at a cheap rate. The low value of smalls has no doubt been considered by those who have not as yet introduced breaking machinery. We know that coal is much dearer in Continental than in English towns, and may expect that the local rates for coal will to a large extent influence those obtainable for coke, and on the Continent the advantages of a smokeless fuel carry greater weight. I think it will be found that Continental coke receipts represent a larger percentage as compared with local cost of coal than those in England, and this would indicate that there exists a good margin for improvement in our coke trade on the lines indicated by Mr. Watson.

A new precedent in gas testing has been constituted by the acceptance on the part of the Gas Light and Coke Company of the calorimeter as a legal testing instrument. The new feature has aroused considerable interest both for and against, and many opinions have been expressed. It should be explained first that the question was not discussed or decided upon its own merits. The London County Council on the one side, and the Gas Light and Coke Company on

the other, have been driving a hard bargain before Parliament. And the acceptance of the calorimeter is a part of the price paid by the Gas Company as a consideration for other advantages that have no connection with the question, and do not concern it in any way. For 30 years or so prior to 1906, the London Gas Companies were subject to four official tests—illuminating power, sulphuretted hydrogen, ammonia and sulphur compounds other than sulphuretted hydrogen. The first two are no doubt of considerable importance, and the representatives of the public can reasonably claim stringent restrictions. As much, however, cannot be said of the last two. Seeing that ammonia is a marketable commodity and is easily extracted, it goes without saying that there have not been many fines under that head. The difficulties with regard to the fourth head are so well known that they need not be repeated. Under the new arrangements of 1906, there are only two penalty clauses, and those the first two above named. The ammonia test was discarded, and tests for sulphur compounds, illuminating power by a flat flame burner, and calorific power, were added, but carried no penalties. Now the calorific test is to be transferred to the penalty class.

The test is not a rigorous one. Had it been anything on the lines of the ammonia and sulphur clauses, which were of an unpractical and over-rigorous character, resulting in the Gas Companies being pilloried and fined for matters admittedly beyond their control, there would be much to say against it. There was frequently reason for pointing out that the sulphur compounds were to some extent beyond practical control. And it may be urged that calorific value is an incidental quality for which no engineer can be reasonably held responsible. If the candle power is below the standard, the engineer can readily increase it. A qualified man can make 14, 15, 16 or 17-candle gas, and keep it within a fraction of the figure agreed on. But beyond the fact that there is some indirect relationship between photometrical and calorific value, there is no similar means of working to an agreed calorimetric standard. Evidently this fact has been appreciated, for the standard agreed on, 125 calories, or 496 B.T.U., is well below the minimum limit of gas as ordinarily manufactured. Straight coal gas runs well over 600 B.T.U. and mixed gas over 550. But against this a margin of 10 per cent. is allowed, so that penalties do not commence until the value drops below 450. Gas of less than 450 is not fit to sell, unless at a proportionately lower price, and anyone offering the public such stuff will secure certain penalties of a more rigorous and lasting nature than those conferred under the Act. The standard of 496 B.T.U. and the margin of 10 per cent. show a disposition to recognize, in a reasonable way, the practical difficulties connected with the question, which was markedly absent when the sulphur clauses were inflicted.

It has long been felt that the photometer is practically obsolete, seeing that 90 per cent. of the gas supplied to-day is used as a calorific and not as a photometrical agent, and that the flat flame is rapidly giving way to the incandescent burner. So the calorimeter is accepted as a means of ending this anomalous state of things, and the existence of a dual test of quality for a few years, during the transition period, is not objected to. Anything in the way of permanent increase in the restrictions as to quality and purity would not be accepted with favor, for there is a strong and growing opinion to the effect that gas should enjoy the same free hand that is available for other heating or lighting agents. There is no similar restriction in other cases. The wave of commercialism that has enveloped gas engineers is destined to bring forth fruit in many directions. Instead of poring over technical details directed towards getting another 100 cubic feet per ton, or reducing the purifying charges by one-tenth of a penny, they will come out of their shells and have something to say on these and similar questions. There is a strong feeling to the effect that details of quality and purity can and will be settled by the laws of supply and demand, which control most of the buying and selling of the day. And the strongest opposition comes from those who object, not to the form of the new restriction, but to any restriction at all. They admit that at present it is desirable to sell gas at 600 B.T.U., but urge that in these days of advancement the position may be altered next year, and that things move much more rapidly in everyday life than they do in the dignified and leisurely proceedings connected with the committee rooms of the House of Commons.

Items of Interest
FROM VARIOUS LOCALITIES.

"V. B.," writing under date of the 13th inst., says: "I note the item which appeared in the JOURNAL recently respecting the organization of the St. Charles City (Mo.) Gas Company, and supplement that with this instance, which was printed in the Freeport (Ills.) *Daily Gazette* of the 16th inst.—it is authentic: 'Mr. Z. T. F. Runner has returned from Charles City, Mo., where with his nephew, Mr. R. K. Runner, he was looking after the organization of the Charles City Gas Company, which is the official designation of the corporation. The officers of the Company are: Directors, C. D. Ellis, A. E. Ellis and N. Frudden, of Charles City, Mo., and Messrs. R. K. and Z. T. F. Runner, of Freeport, Ills.; President, Z. T. F. Runner; Vice-President, C. D. Ellis; Secretary, R. K. Runner; Treasurer, A. E. Ellis. The Company has leased for its office quarters in the Security Trust and Savings Bank, and has purchased a tract of land along the Illinois Railroad for its works. It has ordered pipe for 12 miles of street mains, and within a few weeks it expects to place a contract for all the necessary apparatus, and it is bound to send out gas to its customers before October first. Several of the shareholders in the Freeport Company are interested in the Charles City enterprise, and the Charles City men interested are amongst the most prominent capitalists there. For instance, Mr. C. D. Ellis is President of the First National Bank, and Mr. A. E. Ellis is President of the Security Trust and Savings Bank, while Mr. Frudden is President of a syndicate operating a chain of lumber yards. It is not necessary in any sense to tell a gas man who the Senior Runner is. Mr. R. K. Runner will act as Manager of the plant. He will remove to Charles City.'"

MR. R. R. ROGERS, of Hillsdale, Mich., will hereafter have charge of the new business division of the trading of the Knoxville (Tenn.) Gas Company.

THE entire possessions of the Nebraska City (Neb.) Gas Company were sold the 12th inst., at receiver's sale, under direction of the Special Master acting under an order of the Federal Court. The sale was held in Lincoln. The property was purchased by Messrs. Frank R. Glover and C. C. Loser, of Chicago, who bid $6,000 for it. The purchasers intend to rebuild the works.

THE proprietors of the La Porte (Ind.) Gas Company are congratulating themselves over the successful "baking school" (so they termed it) conducted by them for several days. Nearly every housewife in the place attended it.

THE special bill that was considered by the Pennsylvania Legislature, which had for its object the placing of a tax on each 1,000 cubic feet of gas sold, was defeated.

THE properties of the Haverhill (Mass.) Gas Company have been purchased from the Messrs. Nevins, and we understand that the purchasers are Messrs. Stone and Webster, of Boston. Mr. P. J. Nevins will remain as Manager, at least for a while. The new owners assume the property subject to the direction of the Board of Gas and Electric Light Commissioners that gas be sold in Haverhill at 80 cents per 1,000 cubic feet, which decision was appealed from, and in which a final decision has not been made.

"Rochester (N. Y.) has a newspaper that carries the warm caption *The Griddle*, and it often publishes some very hot stuff, seems to know Mr. 'Bob' M. Searle, of the Rochester Railway and Light Company, pretty well, for it frequently fires hot shot at him. However, it looks to me that these shootings do not seem to harm him greatly, for he grows in weight and unction under the bombarding. To get right at it, though, the cause of this mention is the following griddling: 'R. M. Searle, a noted comedian of the ministrel world, will be among the cast in the American Comedy 'I Had a Gas Range,' to be presented at the Behon's theater next week. Mr. Searle is well known in this city, and is remembered among playgoers as the person who a year ago created much amusement on the stage at Powers Hotel during a banquet, by using a knife and fork as a pair of clappers. The play abounds in funny sayings and lively songs. The press agent assures us that Mr. Searle is down on the programme for that pretty ballad, 'Some day gas will lead me to a gold mine.'"—C.

SECRETARY STANNARD, of the Denver (Col.) Gas and Electric Company, and his men in the new business division of the Company, are not letting up a bit on their successful campaign for taking on new gas accounts and increasing the monthly value of old ones. Some of the literature recently sent on such account by the Company is all to the good.

MR. P. J. NEVINS, General Manager of the Haverhill (Mass.) Gas Company, announces that he and his associates have secured all the franchises needed from the hands of the local authorities of Whitman, Rockland, Abington and Weymouth, Mass., and have virtually secured the right to do business in Braintree, Hingham and Nantasket Beach, Mass. It is thought that a central plant will be established, and the supply to the extremes of the districts named be carried on by means of a high pressure system. There are 40,000 people resident in the places named, and those qualified to speak thereon say that the scheme is bound to be a profitable one from the start.

"SOME days ago Mr F. H. Sawyer, who recently retired from the staff of the City Gas Company, of Norfolk, Va., to assume charge of the gas properties at New Berne, N. C., which were recently acquired by Mr. Sawyer and his associates, was presented by the officials of the Norfolk and Portsmouth (Va.) Traction Company, with a beautiful silver service. The presentation speech, which was certainly a gem in that line, was made by General Manager Hathaway.—V. R."

THE Gas Bench Construction Company, of St. Louis, has been awarded a contract for the new generating installation to be erected for the Athens (Ga.) Gas Company, which Company is making extensive improvements on its plant.

THE Gas Bench Construction Company has also been awarded the contract for additional generating capacity for the Portage (Wis.) American Gas Company. This plant, as to its generating division, is being remodelled from plain fired benches of 3's to recuperator benches of 6's.

"KEEP your eye on the Suburban Gas Company, of Chester, Pa. The increased business that is being done thereby is doubling the intensity of the color which suffuses the facial skin that stretches over Manager Shelton's physiognomy, and long may it suffuse. The reason I advise keeping an eye on the gas makers there springs from a paragraph in the Philadelphia *Ledger* dated Chester, April 19th: 'The Suburban Gas Company has decided to spend over $100,000 in better equipment and for increasing the capacity of its plant'—R. D."

THE real estate holdings of the Consolidated Gas Company, of Pittsburgh, Pa., at the corner of Thirty third street and Putney alley, have been purchased by the Carnegie Steel Company.

THE plant of the Wooster (O.) Gas Company was shut down last Saturday. "Owing to the increased use of natural gas and electric currents," the notice to its patrons read. This is the second time within 4 years that the Wooster artificial gas makers closed up shop.

MR. W. K. EAVENSON has resigned from the Commercial Department of the United Gas Improvement Company, to take service in a similar capacity with the Consolidated Gas Company, of New York. His headquarters are in the new offices recently opened in the premises, No. 29 East 21st street.

"B. B.," writing from Springfield, Mass., under date of the 19th inst., incloses the following: "Mr. F. L. Belcher, purchasing agent for the Springfield Company, recently entertained the feminine division of the employees of the Company at his home on Allen street. The treat was a 'sugar eat,' served and consumed in approved Vermont style."

JUDGE POLLOCK has appointed Mr. J. F. Springfield as Receiver for the Hutchinson (Kas.) Water, Gas and Light Company, at the instance of the petition of Messrs. Mason, Lewis & Co., of Boston, Mass.

AMONGST the orders recently received by the Isbell-Porter Company, of Newark, N. J., is a gas scrubber for the Camden Coke Company, to have a daily capacity of 4,000,000 cubic feet.

"B. F. G.," writing from St. Louis, Mo., under date of the 19th inst., incloses the following: "In conformity with a decision reached at a meeting of the Board of Directors, held last January, the Hannibal Gas Company announced this week a reduction of the gas rate to $1.25 per 1,000 cubic feet, to take effect May first. As figures demonstrate, Hannibal justly plumes herself on one of the most progressive and pushing gas companies in the State, and one of the best equipped and handled plants. In the 3 years that the Company has been in control prices on gas have been reduced in two successive steps from $1.80, where they originally stood, to the last figure of $1.25 per 1,000 feet. With this reduction the Company has extended its mains in all directions to give all the advantage of the gas; has opened a modern and up to-date supply office in the business district, the equal of any in a city of this size in the State, and has sold its fixtures and stoves at cost in its efforts to increase its business. Many of its mains have been laid at great expense through solid rock. Besides its regular State and county and city taxes, which the Company pays on its properties, that are valued in the aggregate at something like $200,000, it has also paid a city franchise tax amounting last year to $830.95, a tax which it is probable no other company in the State has to pay. With the new rate in effect, few other Missouri cities will enjoy lower rates than Hannibal. Although comparisons of gas rates are difficult because of the many different ways of apportioning the cost of light and fuel gas and the discount on each, a reference to the register of public service corporations shows that many cities charge a high price for illuminating gas and a much lower one for fuel gas, in order to encourage the use of gas for fuel. In other places where the gas rate is low it will be found that electric and gas plants are both owned by the same Company and a high rate is charged for electricity. The cost of gas is directly dependent upon the quantity that can be sold, so it would be manifestly unfair to compare Hannibal with cities much larger. With St. Louis, for instance, where more gas is consumed in a day than in Hannibal in a month. The Company is gaining all round, and, best of all, it stands well with the community."

THE annual meeting of the Columbus (O.) Gas and Fuel Company, will be held the 5th prox.

THE Indiana Lighting Company has virtually agreed with the Decatur (Ills.) City Council that the rate for artificial gas in that city will rule at $1 per 1,000 cubic feet, instead of $1.15 per 1,000 as originally proposed.

MR. JAS. M. MITCHELL, President of the American National Bank, of Mt. Carmel, Ills., has been appointed Receiver of the Mt. Carmel Gas and Electric Company. He has qualified and is in charge.

MR. A. B. SPRINGER, of Chicago, under date of the 18th inst., sends us this: "A series of gas producer tests is now being conducted in the Mechanical Engineering Laboratory of the University of Illinois. The object of these tests is to provide important data on the efficiency and operation of small producer plants of the ordinary or general class, using different grades of anthracite coal. A rather elaborate line of investigation has been planned and the producer has been equipped accordingly. The plant, as installed by the Otto Gas Engine Works, consists of a 60 horse power suction gas producer, with 1 wet scrubber, a holder and a 22-horse power gas engine. In order to facilitate testing, a Schutte-Korting steam ejector of 12,000 cubic feet capacity was installed beyond the first scrubber to provide the necessary suction. Gas is drawn from the producer through the first scrubber, and is ejected into the second scrubber, in which the steam used by the injector is condensed. From the second scrubber the gas passes to a dryer, and from the dryer to two Westinghouse gas meters, connected in parallel. Means have been provided for obtaining the moisture in the gas and the temperature in the fuel bed, the amount of air used by the producer being determined from a calibrated orifice, which quantity is later checked from the analysis of the gas and of the coal. The Junkers calorimeter and the Hempel analytical apparatus are also used."

COL. E. G. PRATT and associates, of Chicago, are still endeavoring to convince the authorities of Ames, Ia., to issue to them a franchise for the construction and operation of a gas works in that settlement.

"R. S. L.," writing under date of the 22d inst., says: "The Utica (N. Y.) Gas and Electric Company is safely housed in its new quarters. The property was bought by the Company at the public sale held by the County Building Commissioners, and since then the building has been remodeled and changed to meet the requirements of the case. It will be admirably adapted to the use of the Company. Enlarged windows have been placed in the front of the building with prismatic glass in the upper parts, while the old stairway leading to the second floor has been removed. The steps on the front of the old building have been carried inside the building, where a vestibule has been provided. The woodwork throughout is in quartered oak and all door trimmings are of bronze. The salesrooms of the Company will be located on the first floor. There is a tile flooring and every requirement necessary. An elevator connects the upper floors. The Vice-President's office will be located on the south side of the room and there will be compartments for the Cashier and other clerks. The electric lighting will be of especial and unusually attractive design. It will be necessary to see it to appreciate it. M. Jesse Brayton, the Secretary of the Company, and W. J. Cahill, the Manager of the gas division, will have private offices on the second floor, front. There will be a large room on this floor for the Directors, while the Engineer and the Manager of the electric department will have private offices on the Washington street side of the building. Storerooms are provided on this floor. The vault on the first floor has been extended to the second floor and used for the storing of maps and other valuable documents. Secretary M. Jesse Brayton designed the arrangement of the new office, a model one in every way."

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHARLES H. WADELTON,
MANAGER.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 42 Pine Street, New York.
Telephone, 2996 John.

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance, Single copies, 10 cents.

MONDAY, APRIL 26, 1909.

The Market for Gas Securities.

Trading in Consolidated was infrequent since the last time of writing, but prices, despite the drooping tendency on the Exchange of the general list, held well. The bid figure at noon to-day (Friday) was 137¼, holders asking ¼ point higher. We have no hesitancy in declaring that before May is at an end, certain positive developments in the artificial lighting supply of the city will have sent Consolidated to a figure that, did we name it now, would create laughter rather than concurrence.

Brooklyn Union showed a trifle of life last week, and capitalists in that Borough are certainly looking up the bond market. Peoples, of Chicago, is 116½ bid; Washington (D. C.) is 385 to 387½, and Massachusetts common is 65 to 65½.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

APRIL 26.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated Gas Co.	$78,177,000	100	137	137½
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	42
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	100	101
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	133	135
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	200,000	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	1¼	1½
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	60	60¼
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	106½
Cincinnati Gas and Electric Co.	29,500,000	100	91½	92
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,662,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,000,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 5's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	103	103½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis	10,000,000	100	—	100
Preferred	2,500,000	100	60	90
Bonds	10,000,000	1,000	104	104½
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108½
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	65	65¼
Preferred	25,000,000	100	93½	94
Montreal Gas Co., Canada	2,000,000	100	218	218½
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	127	128
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	116½	116¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,445,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	2,600,000	20	385	387½
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	230	—

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(*Continued on page 742.*)

PROPOSALS INVITED.

OFFICE OF SUPERINTENDENT OF CITY GAS WORKS, RICHMOND, VA., April 26, 1909.

Sealed proposals will be received at this office, Room 9, City Hall, until 4 P.M., May 17, 1909, for the purchase and removal of all the coal and water gas tar and crude ammoniacal liquor produced at these works for a period of 2, 3 or 5 years, commencing July 1, 1909. Bids for the respective tars must be made per gallon, and the ammoniacal liquor upon the basis, per ton (2,240 lbs.) of coal carbonized, for the respective terms. The above products are to be delivered from our storage tanks at these works. The successful bidder will be required to furnish suitable receptacles to hold above products, and to remove same, from time to time, as may be required to prevent an overflow of our storage tanks. Monthly payments will be required for each month's delivery. A certified check for one hundred dollars ($100), payable to the City Treasurer, must accompany each bid. The successful bidder will be required to execute a trust company's bond in the sum of two thousand dollars ($2,000) for the faithful performance of the contract. Bids must be sealed and marked, "Bid for Tar, etc.," and addressed to the undersigned. The Committee on Light reserves the right to reject any and all bids offered, and to award the contract as a whole or in separate parts, subject to the approval of City Council. W. P. KNOWLES, Supt.

1.68-1

Position Wanted
As Superintendent,

By a competent gas man who has had practical experience in all branches of the business, both coal and water gas. At present employed. A-1 references.

1755-tf Address, "R. C.," care this Journal.

Situation Wanted.

Increased sales—decreased operating cost. Can you use a man who can do this? Address, "M. O.,"

1767-2 Care this Journal.

NOTICE.

Twenty months ago I was drawing $1,500 a year as superintendent of a gas and electric property. I left them voluntarily to engage in a business which, through no fault of mine, has not yielded sufficient return. If any party or parties desire to engage my services for less money than I had been getting, I will correspond with them or give them a personal interview. Am willing to work for a nominal sum, as I will not remain idle. After a period of 1 year I shall leave it to my employer to say if I am worth more to him than that at which I had been engaged. *But first and foremost I want work.*

1767-3 Address, "C. B. Q.," care this Journal.

Position Wanted.

Mason, 12 years' experience in firebrick and benchwork, desires steady position in a gas works. References.

1767-3 Address, "O. D.," care this Journal.

Position Wanted.

On or before May 1st I shall be open for a position as superintendent or manager of a gas or electric property or of a combined property. I am a graduate of a leading technical university and have had 6 years of actual operation in the above lines. I am obliged to look for a position because of a complete change in the management of the companies I am now employed with as assistant to the president. I can refer directly to him as one of my references, and also to several leading gas and electrical engineers as to my ability and character. I am 29 years of age. Address reply to "M.,"

1768-tf Care this Journal.

Position Wanted
As Working Foreman of a Coal Gas Plant,

By a young man (27). Can give best of references. Middle West preferred.

1768-1 Address, "C. F.," care this Journal.

WANTED,
First-Class Gas Maker in Small Eastern Town.

Give experience and references and salary expected. Address, "H.,"

1768-3 Care this Journal.

WANTED,

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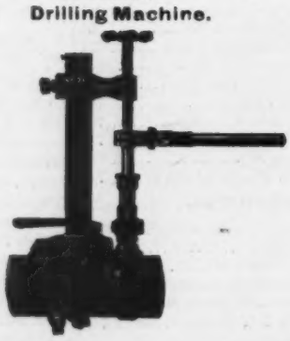

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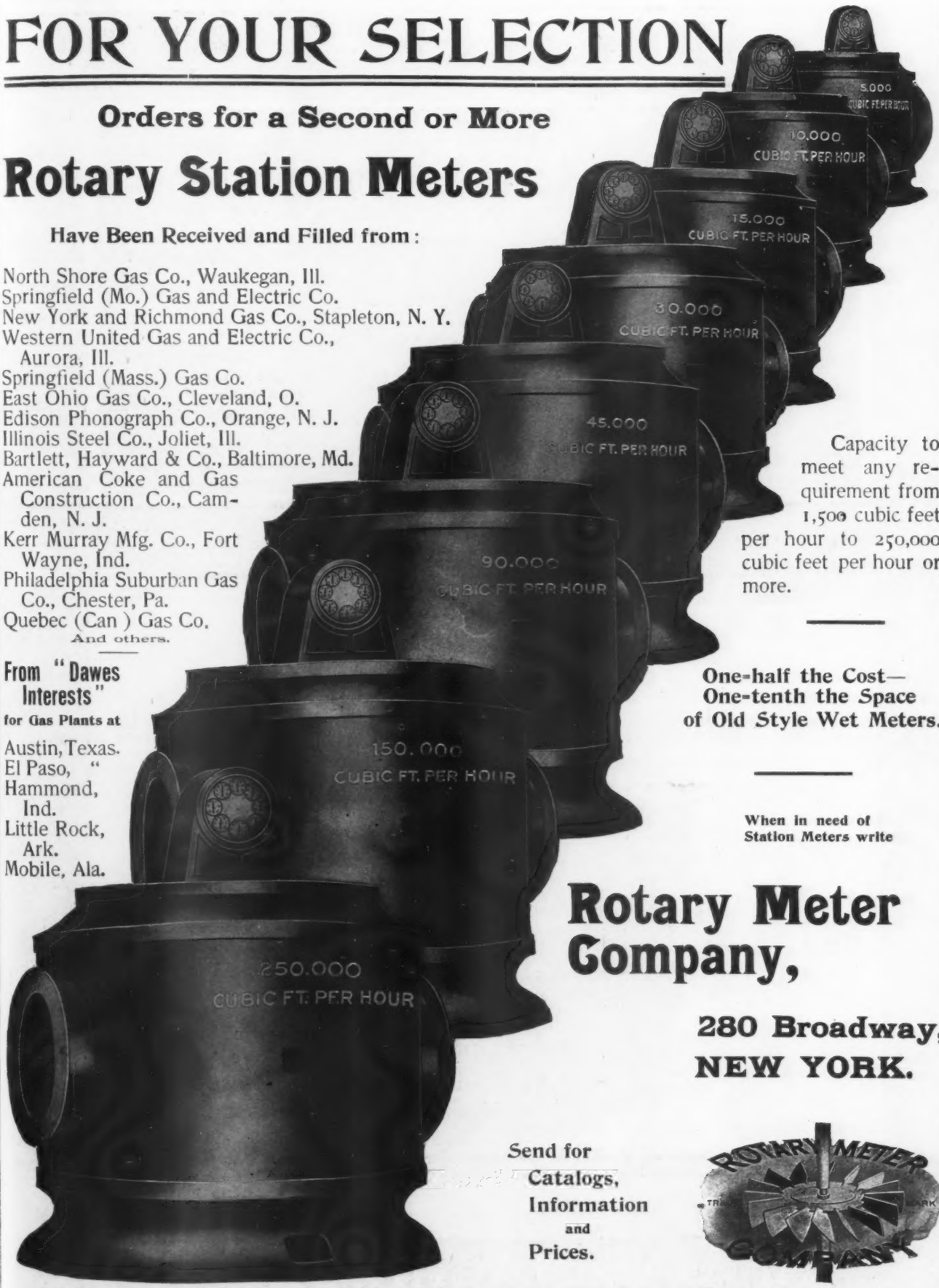
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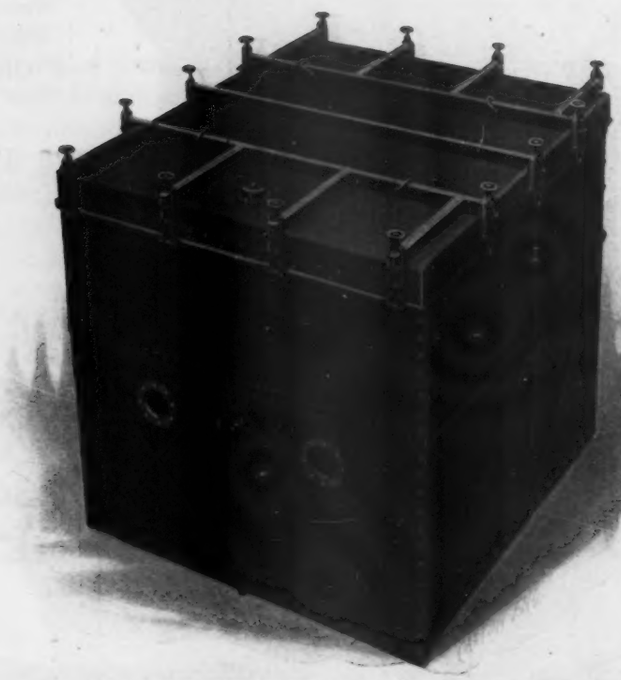

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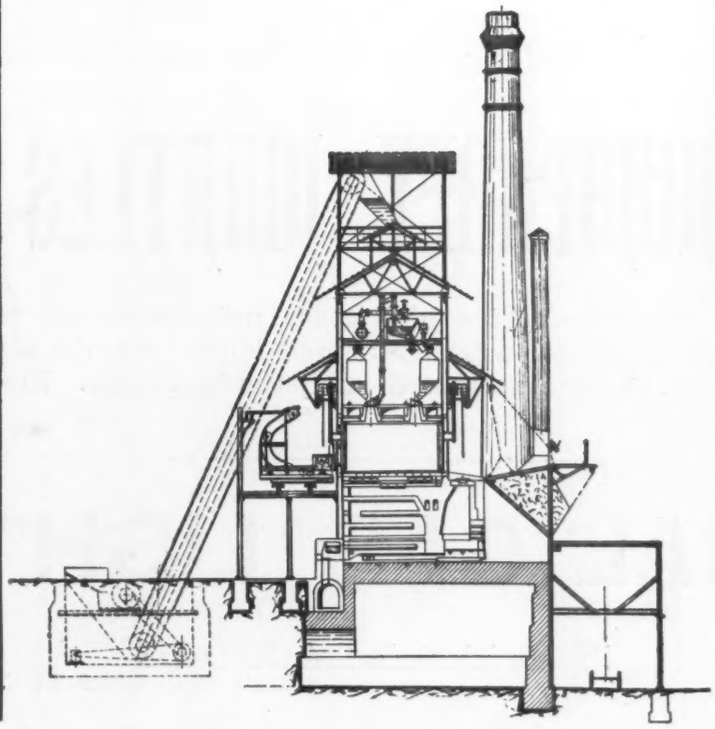

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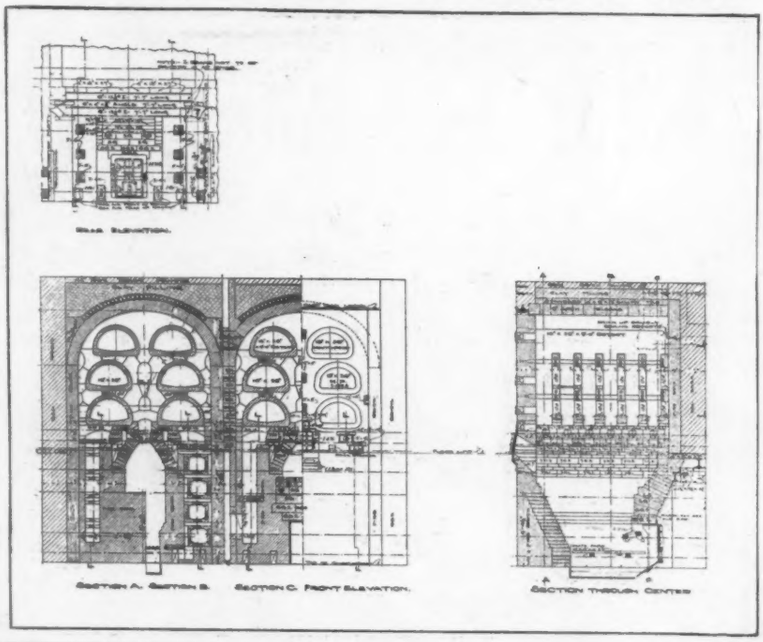

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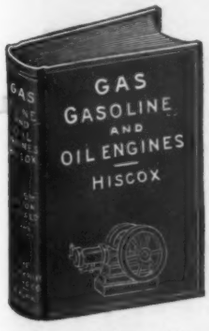

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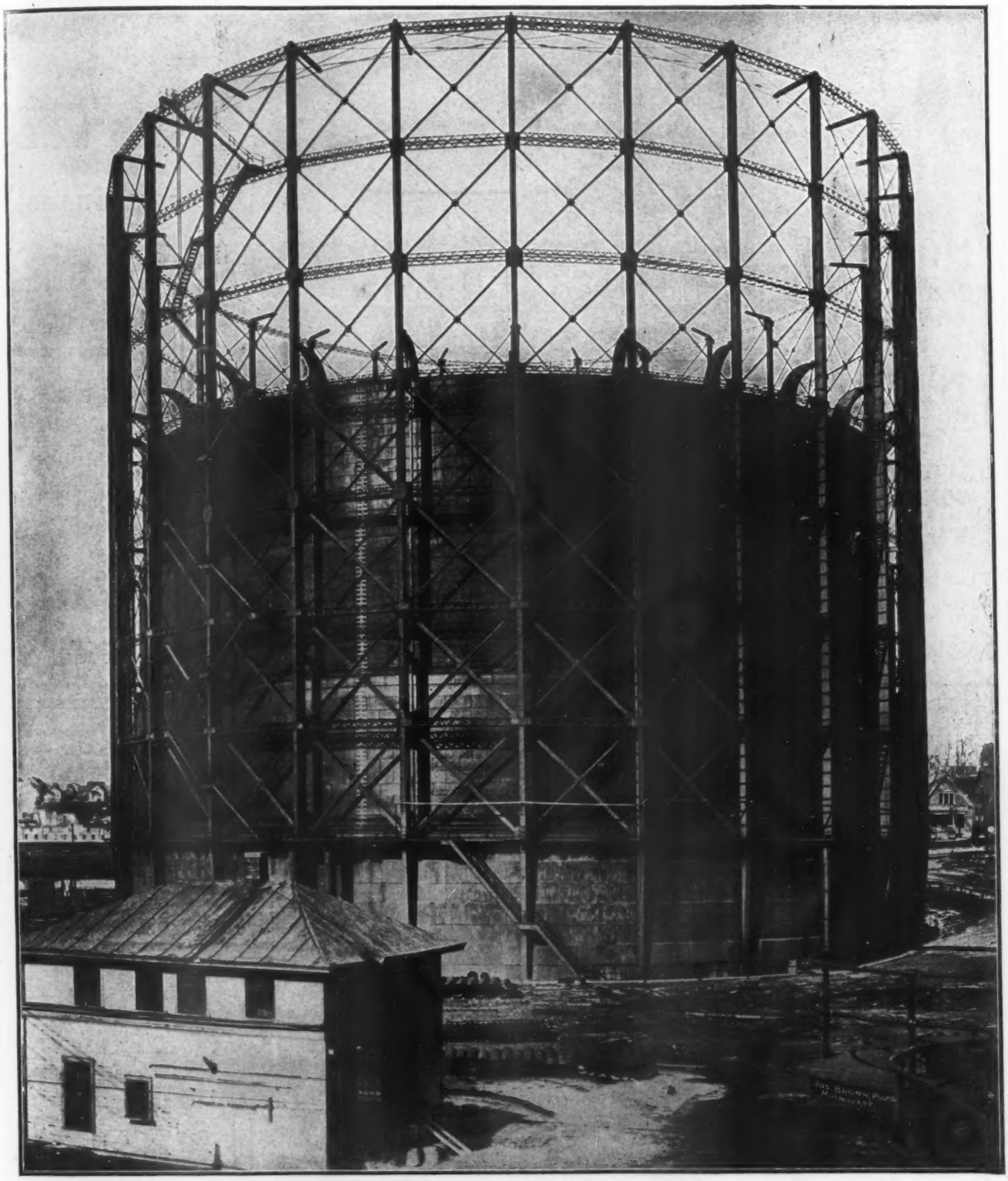

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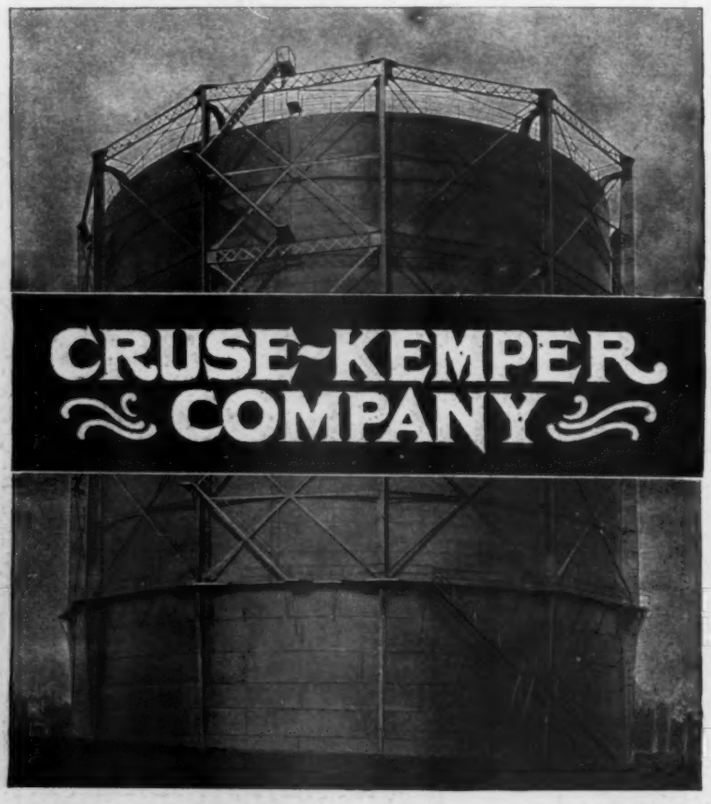

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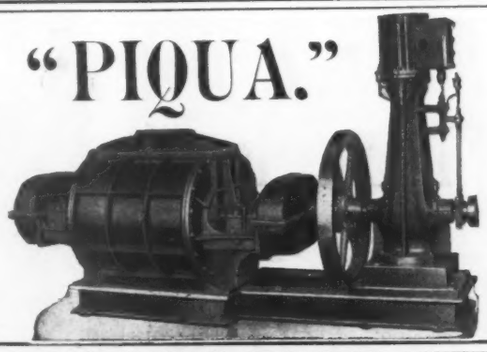

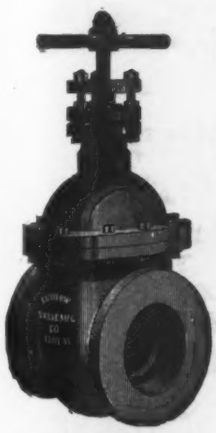

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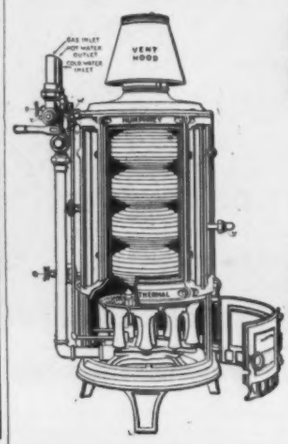

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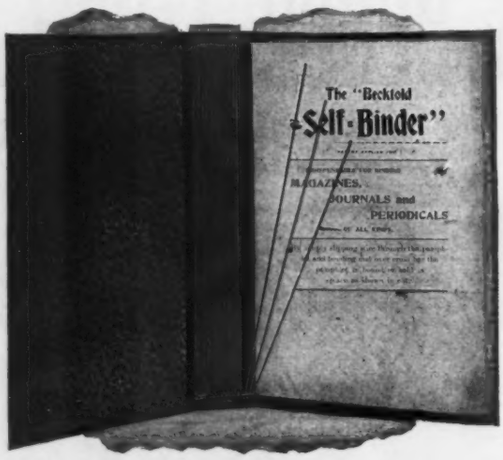

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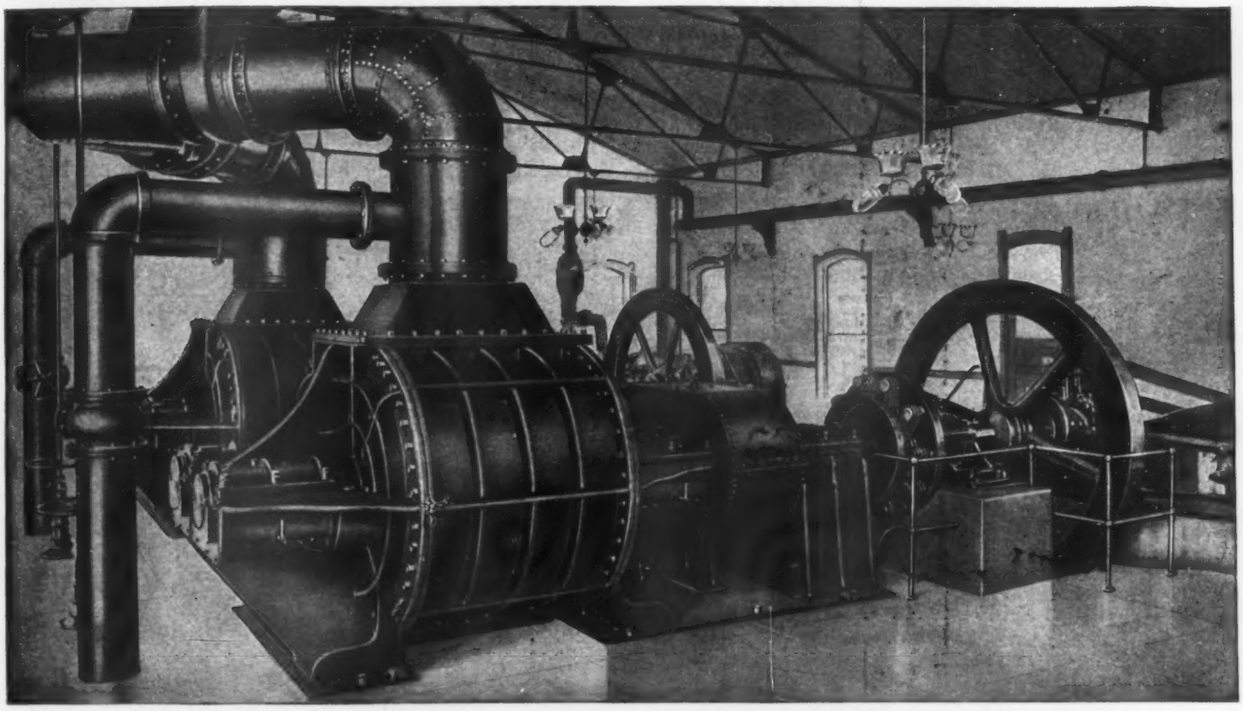

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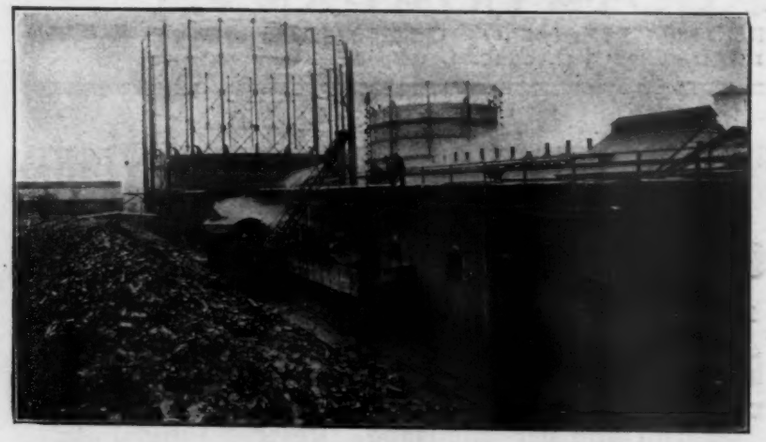

WRITE for our Catalogue "O" just issued. This Catalogue deals entirely with "Brownhoist" Machinery as used at Artificial Gas Plants for handling coal, coke and other materials rapidly and economically.

THE BROWN HOISTING MACHINERY COMPANY,

Designers and Builders of All Kinds of Hoisting Machinery.

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STANDARD REDUCTION FACTORS FOR GASES,

A Number of Tables Necessary for the Reduction of the Volume of any Gas at any Temperature, Pressure and Degree of Saturation to its Equivalent Volume under Standard Conditions,

TOGETHER WITH

A Table for the Numerical Solution of Certain Exponential Equations,

By HELON BROOKS MacFARLAND, B.S., M.M.E.,

Associate Professor of Applied Mechanics, Department of Mechanical Engineering, Armour Institute of Technology, Chicago, Ills.

PRICE, $1.50. For Sale by

A. M. CALLENDER & CO., - - - - - 42 Pine Street, New York City.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

MAY, 1909.

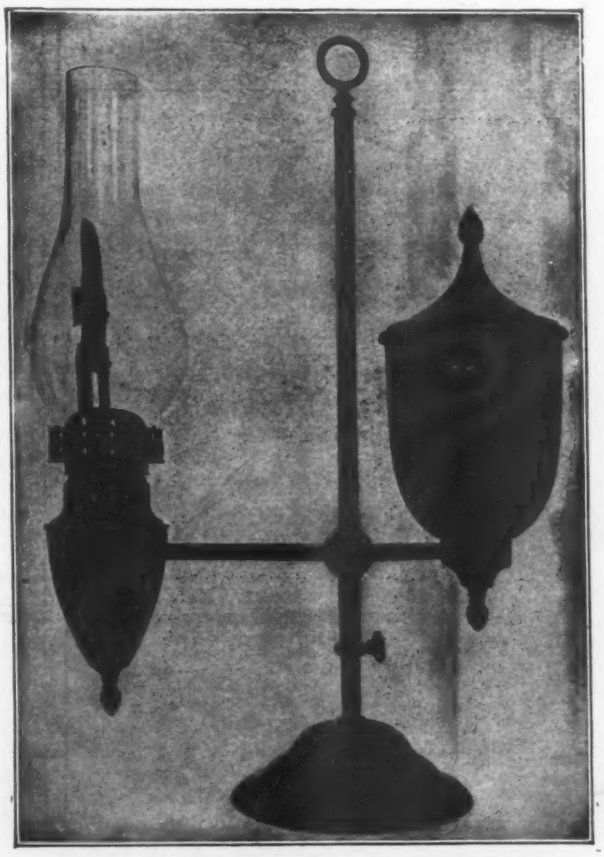
Table No. 1.
FOLLOWING THE MOON.

Day of Week.	Date.	Light.	Extinguish.
Sat.	1	3.00AM	4.00AM
Sun.	2	3.20	4.00
Mon.	3	3.40	4.00
Tue.	4	No L.	No L.
Wed.	5	No L FM	No L.
Thu.	6	No L.	No L.
Fri.	7	7.30PM	10.20PM
Sat.	8	7.30	11.30
Sun.	9	7.30	12.30AM
Mon.	10	7.30	1.20
Tue.	11	7.30	2.00
Wed.	12	7.30LQ	2.40
Thu.	13	7.30	3.10
Fri.	14	7.30	3.40
Sat.	15	7.30	3.40
Sun.	16	7.40	3.40
Mon.	17	7.40	3.40
Tue.	18	7.40	3.40
Wed.	19	7.40NM	3.40
Thu.	20	7.40	3.40
Fri.	21	7.40	3.40
Sat.	22	7.40	3.40
Sun.	23	7.40	3.40
Mon.	24	11.10	3.40
Tue.	25	11.50	3.40
Wed.	26	12.10FQ	3.40
Thu.	27	12.40	3.40
Fri.	28	1.00	3.40
Sat.	29	1.20	3.40
Sun.	30	1.50	3.30
Mon.	31	2.10	3.30

TOTAL HOURS DURING 1909.

By Table No. 1.

	Hrs.Min.
January	212.20
February	183.40
March	173.00
April	151.10
May	144.10
June	138.50
July	145.40
August	160.30
September	180.00
October	201.00
November	216.30
December	233.40
Total, yr.	2140.30



THE ELLIOTT KEROSENE STANDARD PHOTOMETER LAMP.

***

10-Candle Power.

***

This lamp is a perfect substitute for the 10-candle Pentane Lamp hitherto used, and has the following advantages:

1st. It uses Standard Kerosene Oil (Pratt's Astral Oil or equivalent).

2d. It is remarkably steady. Will burn 24 hours continuously with less than 2 per cent. variation.

3d. It is much less dangerous than Pentane, which is a kind of gasolene.

4th. It is not easily affected by air currents in the photometer room.

5th. Since the lamp may burn continuously, the candle power of gas may be taken at any moment, if necessary. This insures steady illuminating power without waste of carburetting material.

6th. The first cost of the lamp brings it within the reach of even small gas works.

7th. Costs much less to maintain than a Pentane lamp or sperm candles doing the same service.

8th. Is not affected by the weather.

PUBLIC LIGHTING TABLE.

MAY, 1909.

Table No. 2.
NEW YORK CITY.
ALL NIGHT LIGHTING.

Day of Week.	Date.	Complete Lighting in One Hour	Complete Extinguishing in 50 Minutes
		From Time Given	
		P. M.	A.M.
Sat.	1	6.47	3.52
Sun.	2	6.47	3.52
Mon.	3	6.47	3.52
Tue.	4	6.47	3.52
Wed.	5	6.47	3.52
Thu.	6	6.47	3.52
Fri.	7	6.57	3.42
Sat.	8	6.57	3.42
Sun.	9	6.57	3.42
Mon.	10	6.57	3.42
Tue.	11	6.57	3.37
Wed.	12	6.57	3.37
Thu.	13	6.57	3.37
Fri.	14	7.07	3.27
Sat.	15	7.07	3.27
Sun.	16	7.07	3.27
Mon.	17	7.07	3.27
Tue.	18	7.07	3.27
Wed.	19	7.07	3.27
Thu.	20	7.07	3.27
Fri.	21	7.12	3.22
Sat.	22	7.12	3.22
Sun.	23	7.12	3.22
Mon.	24	7.12	3.22
Tue.	25	7.12	3.22
Wed.	26	7.12	3.22
Thu.	27	7.12	3.22
Fri.	28	7.12	3.17
Sat.	29	7.12	3.17
Sun.	30	7.12	3.17
Mon.	31	7.12	3.17

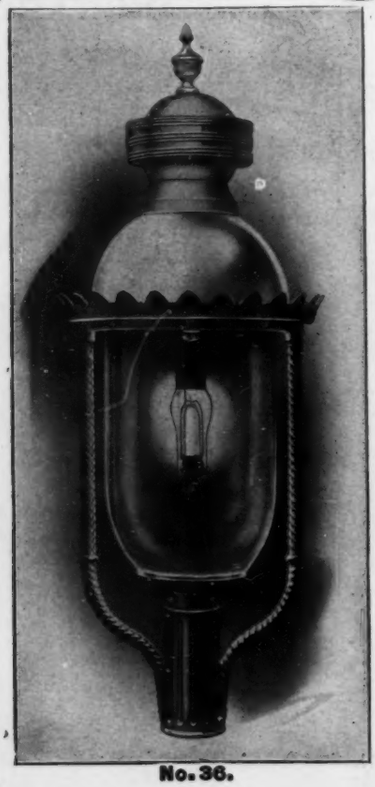
TOTAL HOURS DURING 1909.

	Hrs.Min.
January	428.30
February	358.15
March	353.10
April	298.10
May	263.20
June	234.45
July	248.30
August	278.00
September	311.25
October	370.05
November	397.40
December	438.35
	3980.25
Deduct on account of 50 min. extinguishing time	30.25
Total, yr.	3950.00

NEW YORK, 318 West 42d Street.
BOSTON, 820 Beacon Building.
PHILADELPHIA, Broad and Arch Streets.
ST. LOUIS, 712 Roe Building.
CHICAGO, 218 La Salle Street.
SAN FRANCISCO, 512 Oak Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....



No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

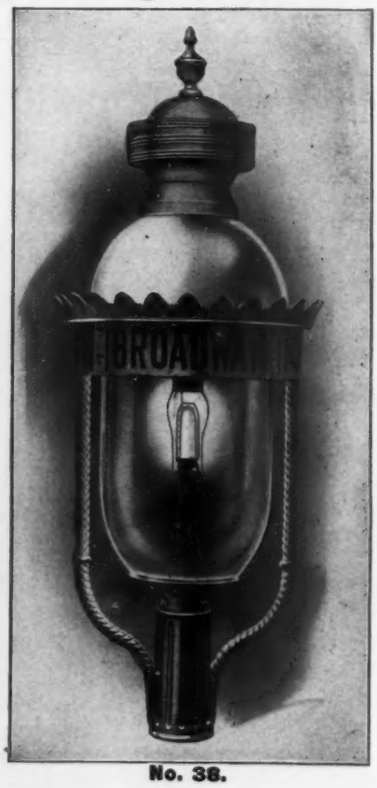
POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.



No. 38.

Welsbach Junior

THE BIGGEST LITTLE LIGHT IN THE WORLD.

The Welsbach Junior Light is 5 inches high--consists of burner, mantle and chimney--and is attractively boxed in a pasteboard carton.

As its effectiveness and economy become better known the Welsbach Junior will supersede, for universal use in the home, the old-style open flame gas burners.

Showing Welsbach Junior Light used in connection with ordinary glass globe.

Gives 50-Candle Power.

Uses Two Feet of Gas per Hour.

Attaches to Any Gas Fixture.

Completely Hidden from View.

Use your own globe--either gas or electric.

SMALL—EFFICIENT—ECONOMICAL.

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Salesrooms in all Leading Cities of the United States.

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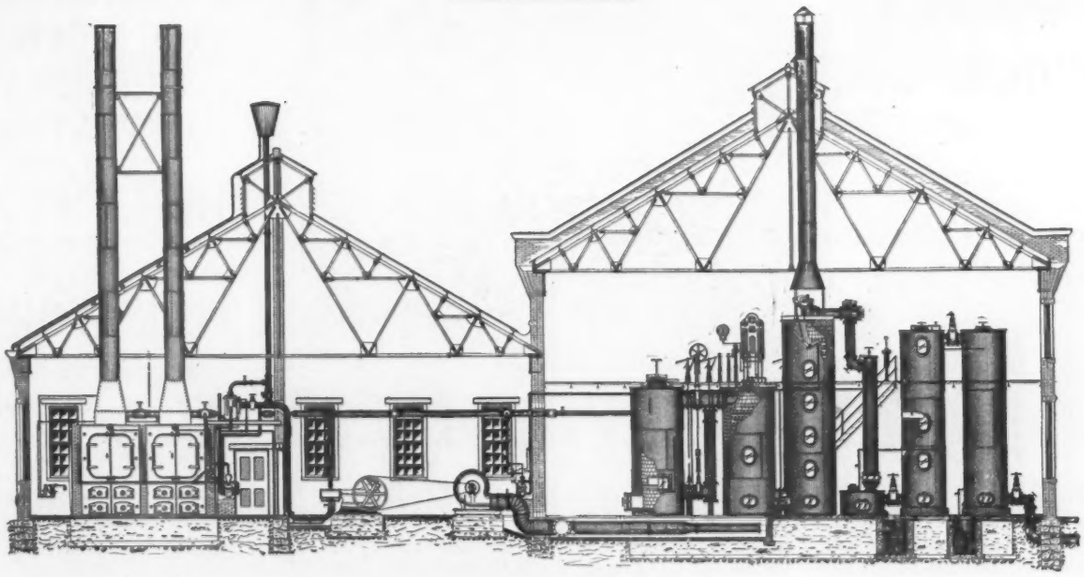
SOLE AMERICAN BUILDERS

OF THE

Standard Double-Superheater Lowe Water Gas Apparatus.



TOTAL SETS INSTALLED TO DECEMBER 31, 1908, ... 690
TOTAL DAILY CAPACITY, TO DECEMBER 31, 1908, ... 558,565,000 cu. ft.

Tar Extractors for Carburetted Water Gas.
Photometrical Apparatus.
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Straight Standpipe System for Coal Gas Retorts.
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Meters for Regulating Air and Steam Supply to Water Gas Apparatus

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In Kegs, 100 to 200 " " 6 " "
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ESTABLISHED 1868.

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This Edition of the "Handbook for Gas Engineers and Managers" is a great improvement on all previous editions. Much of the text has been re-written, in order to keep the work abreast of the constant advances that are being made in the Gas Industry.

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Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada, Detroit, Seattle, Rochester and St. Louis.

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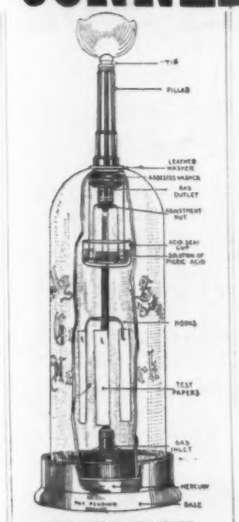

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Automatic, Balance, High Pressure and Service Governors,

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For Gas Making or
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Double Gate Valves.

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These valves are provided with double discs or gates, and are tight with the gas pressure on either side of them.

The discs are so arranged as to be free from their seats when being opened or closed, and are operated by a quick-acting mechanism. The valve stem extends outside of the bonnet, and serves as an index, showing whether the valve is closed or open, and the amount of opening. They are made of the following dimensions:

Size.....	8 inches	10 inches	12 inches	16 inches	20 inches	24 inches	30 inches	36 inches
Diameter of flanges...	13 inches	16 inches	18 inches	22½ inches	27 inches	31 inches	31½ inches	44 inches
Face to face of flange...	12 inches	12 inches	12 inches	14 inches	17 inches	20 inches	31 inches	23⅝ inches

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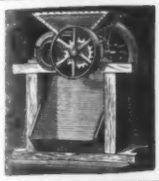

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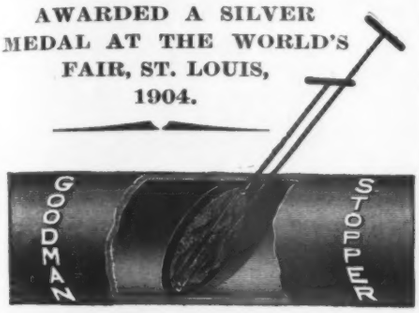

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WITHOUT ANY ESCAPE OF GAS.

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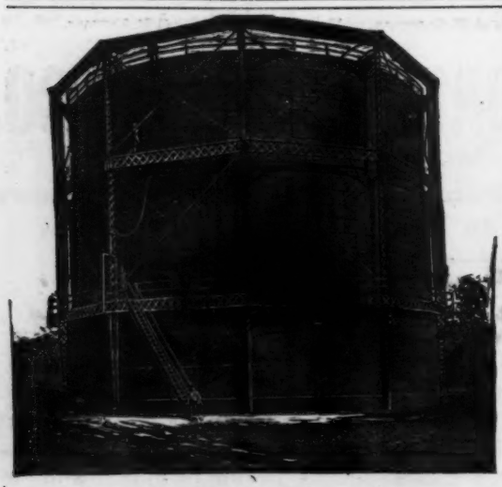

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Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

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DESIGN, CONSTRUCT AND OPERATE
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Some of the economical advantages of these chutes are:

The coke is quenched in closed bins.
Smaller amount of breeze than by any other method.
Minimum loss from incipient combustion.
Entire absence of steam and gases.
Ease of drawing the coke from the chute into the car.

Gas engineers, both designing and operating, should investigate this method of handling coke, and the names of the nearest Gas works using this system will be furnished to those interested in seeing it in operation.

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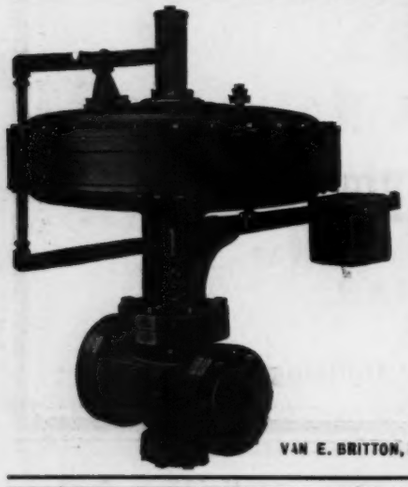

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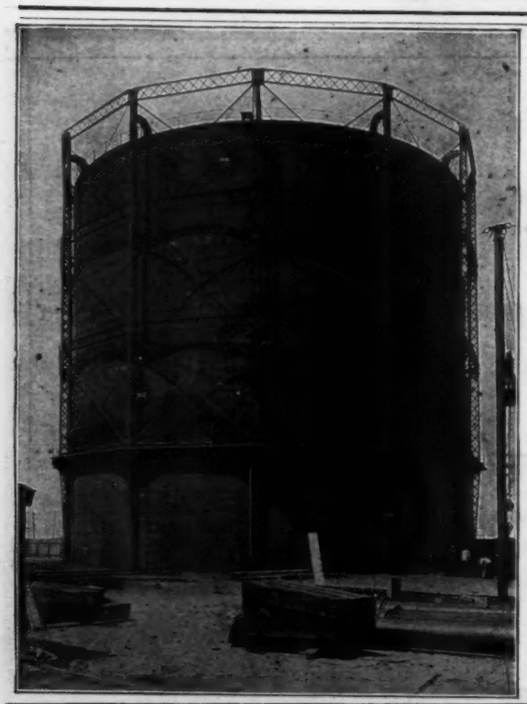

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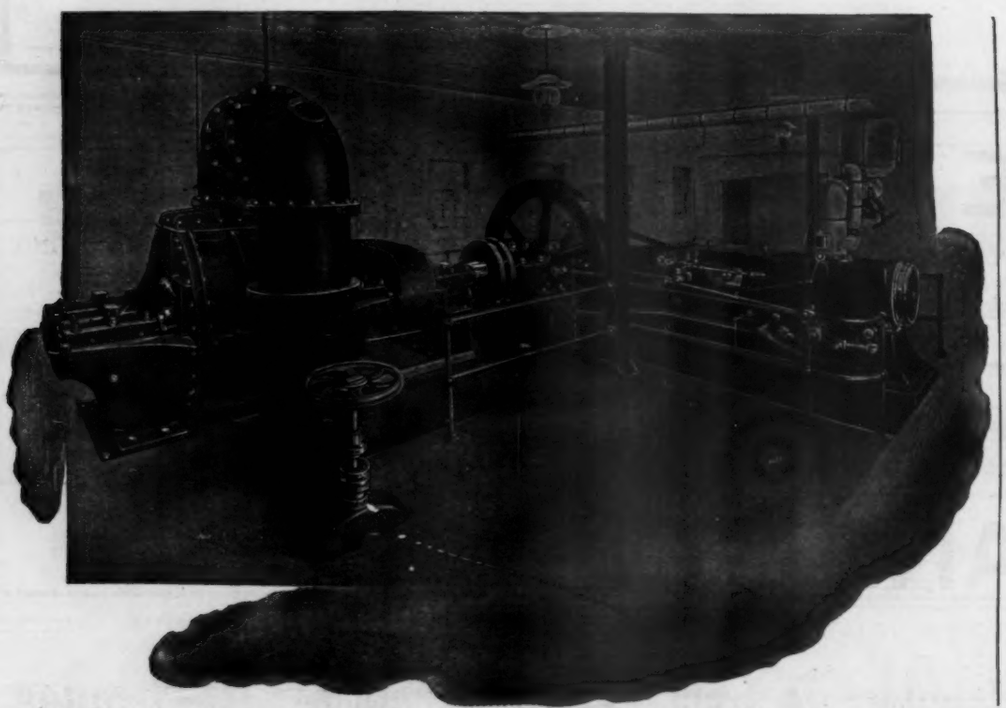

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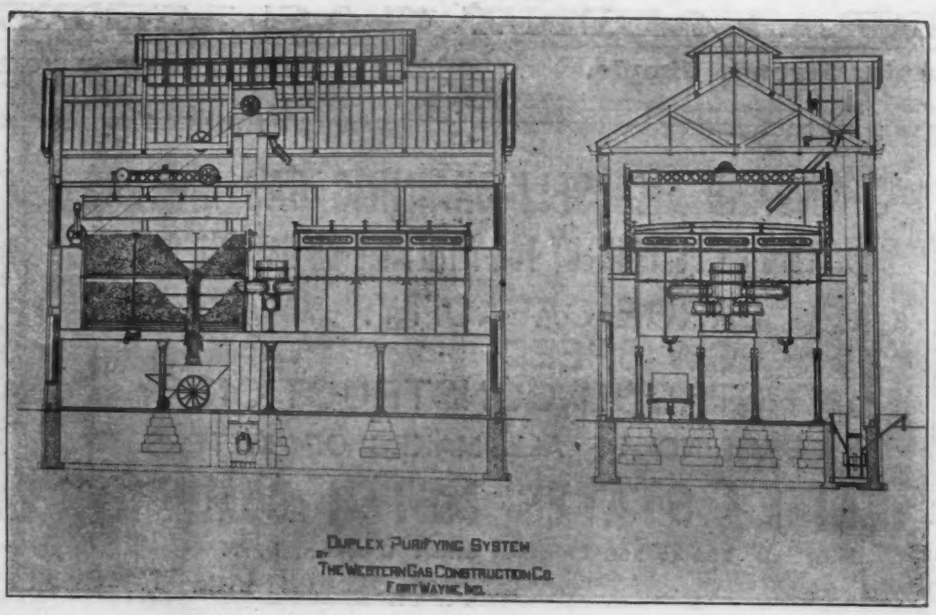

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